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Captain Hopkins takes Valeda out for a trial spin. He incidentally finds that the new iron keel he has added during the winter has affected his compass somewhat

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—May Cover by William de Leftwich Dodge—

The ancient Greek galley which is shown as a phantom in the background of the cover varied in size in the original from 30 to 60 feet, and was built of wood or bronze, one or two constructed from the latter material having been found. The most important of these was unearthed in the excavations of the Greek town Selanti on an island off the north coast of Africa which were made in 1879-80 by the Ecole des Beaux Arts, of Paris. Parts of a galley were here found in the side of a sand hill some half mile inland, the water having, no doubt, receded from this point in the passage of the centuries. As nearly as could be figured from the pieces of bronze which were discovered this galley was about 50 feet long and had places for twelve oarsmen on each side. On the bow was painted a large eye and on either side of the stem there were long spear-shaped timbers used for ramming in time of war. The mast was stepped a little forward of amidships and a square-shaped sail was used, giving a speed of 8 or 9 miles an hour. The remains of this ship are now preserved in the Museum of Naples, Italy.
Mr. Dodge has devoted a good deal of study to this type of craft and his reproduction of it may, therefore, be considered authentic in every detail. Used as it is on our cover in contrast with a modern high-speed runabout, it tells a story which should appeal to all readers of MoToR BoatinG.

May, 1916

**MOTOR
BOATING**

Vol. XVII, No. 5

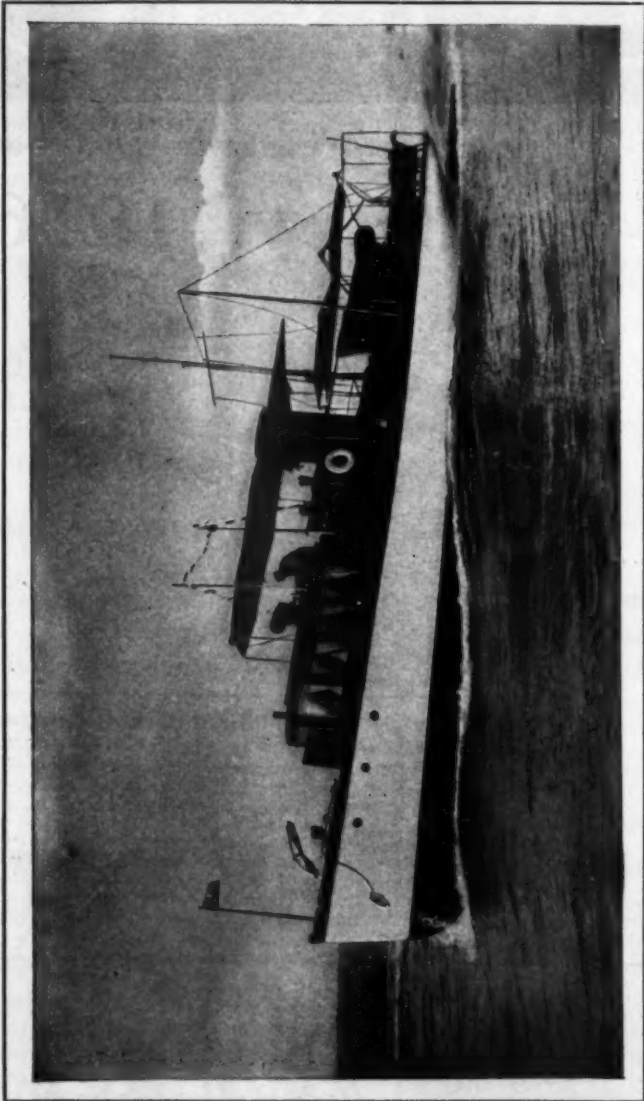
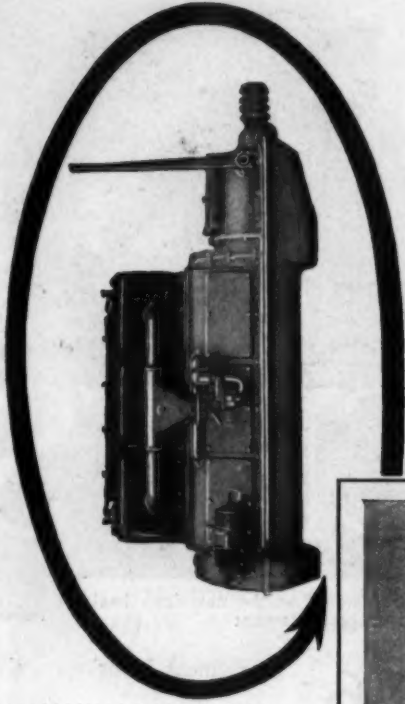
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MOTOR BOATING

NATIONAL MAGAZINE OF MOTORBOATING

Play the Game As You Should

Government Requirements Alone Do Not Guarantee the Success of Any Undertaking—A Certain Amount of Common Sense Necessary Before One Realizes the Charms of the Sea

THE freest thing about our "land of the free" is the water—free of fences, boundaries and all but natural restrictions, and free especially of the interference of the law—so it seems strange that there should be resentment harbored in some quarters against the few simple regulations which do affect the motor boating fraternity. You may decide if you like the clause in the Motor Boat Act which compels us to have on board two copies of the Pilot Rules, and can continue to exercise your sense of humor in nailing them up in plain sight of the inspector, but so securely fastened that it is impossible to gain access to their contents; yet, every question of compulsion aside, save that which safety decrees, you should not object to having aboard the other articles and more than the other articles of equipment specified by the Act.

It isn't our purpose to explain here that the customs inspectors are more or less human, just like regular motor boatmen, or to portray the glow of righteousness which suffuses those who obey the law because it is the law—we'll pass the buck on that to the reverend chaplain of the fleet. We should like to sermonize a little, rather, on the law of personal safety, remarking incidentally that it went into effect some considerable time before the solons at Washington got together and declared that life preservers, whistle, fog horn, bell, lights and fire extinguisher shall be part of the equipment of every motor boat.

It doesn't matter a bit to us if you go out alone in a boat and drop a match in your gasoline tank, or tie up to a channel buoy and like a landlubber blow out the lights and lie down below; our only regret is that in committing suicide you spoil a boat which your heirs and assigns forever would have enjoyed.

But if we happen to know you to be that kind of a sailor when you invite us out for a sail we'll look mighty carefully over your safety equipment, and if it's in good shape will go out with you—after we have taken away your matches and chained you to the samson post. You see, it's personal safety we're preaching.

There are a good many people who think that the carefree life of the sailor includes recklessness and even foolhardiness, but we know of a narrow escape which taught two young motor boatmen who were famous in their day that to be a hardened mariner you don't have to leave your common sense at home. It happened at the entrance to Winyah Bay, S. C., where as some of you may remember, the tide doesn't tarry long as it makes its way out to sea. These two Corinthians had made an all-day run from Southport in a small cruiser, and had spent the last hour of daylight working two miles up from the end of the jetties against that determined tide. Now the Motor Boat Act above referred to doesn't specify that ground tackle shall be carried aboard a motor boat, nor, so far as we can recall, a motor, and it chanced that this particular outfit wasn't very well supplied with either. That is to say, the engine blew out a cylinder-head gasket at this point, while the storm anchor had been lost the day before and had not been replaced.

Need we mention that with over two hundred feet out the light anchor slipped so that the line fairly sang, and that coincidentally the first breaths of a howling east wind commenced to play with the cockpit awning? It was even so, and things looked pretty bad until the little cruiser dragged near to a can buoy, and the skipper, who was agile, got out in the dink and secured a light line to it. (The Lord loves

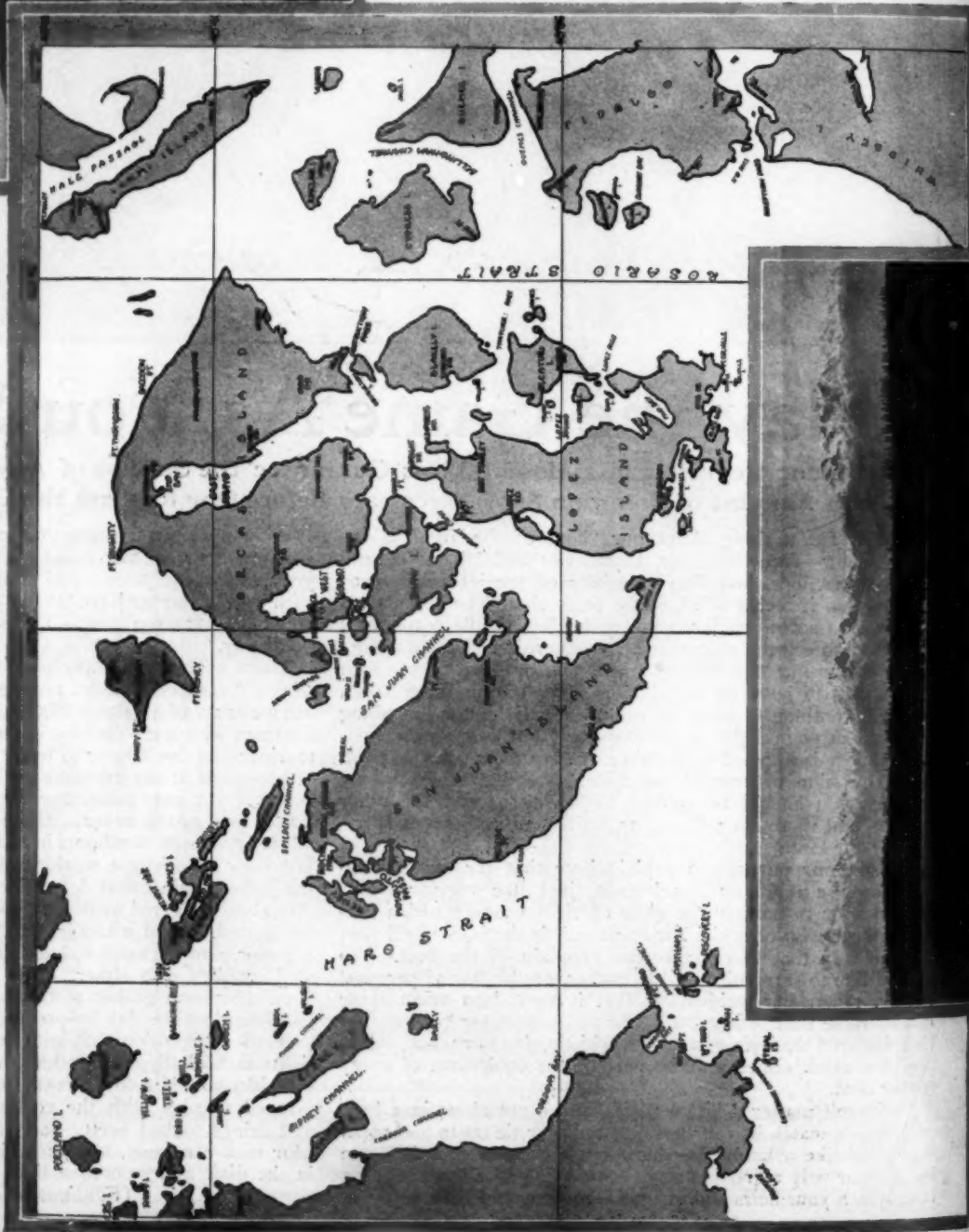
(Continued on page 48)

Where Shall We Cruise Next Summer? No. 5 Among the San Juan Islands

By Taft Morgan

IT'S no problem to us out here on Puget Sound, this question of where to cruise next summer, unless one considers it difficult to choose from the many wonderful routes that are at our disposal. A week, a month or a summer—there is a cruise to fit every length of vacation, and the man who has lived here for ten years and has cruised every summer has yet to explore many a route and many an attractive harbor.

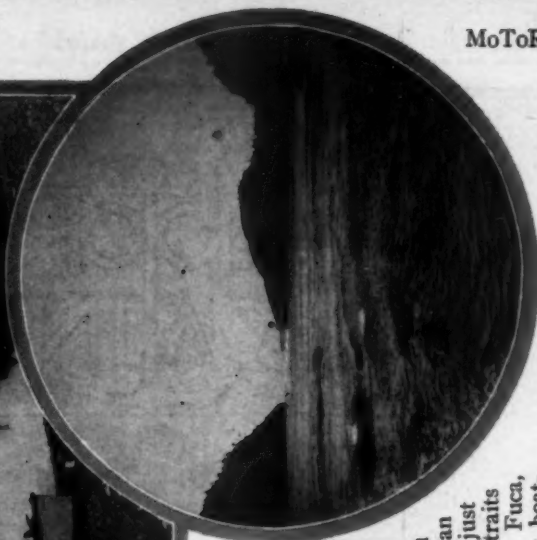
We who live here know the beauties of any cruise in this fairland, and we are supremely unselfish in our knowledge, for we try always to spread that knowledge to every corner of the globe that the amateur sailors of all lands shall know that this, of all places, is the spot for them. For the present I am going to take you with me on just a little cruise, a swing around a small circle out of Seattle, yet I venture to say that



A harbor at Trump Island

on our return you will agree that it is a finer voyage than you have ever taken elsewhere. I'm going to take you up into the San Juan Islands, just north of the straits of San Juan de Fuca, a veritable motor boatman's paradise. And we shall start this cruise from Seattle, the big city of all this northwest country.

We leave our anchorage at the Seattle Yacht Club in the early forenoon, run down to the Standard Oil docks for fuel oil, and by ten o'clock are tied up at one of the numerous city floats on the waterfront, taking on our crew and stores. Everything we wish to stow aboard, from a sack of peanuts to a quarter of beef, is delivered just when we want it right at the float, and by eleven o'clock, with every happy man jack aboard,



Looking out through Deception Pass



A glimpse of Olympic mountains as seen from a motor cruiser

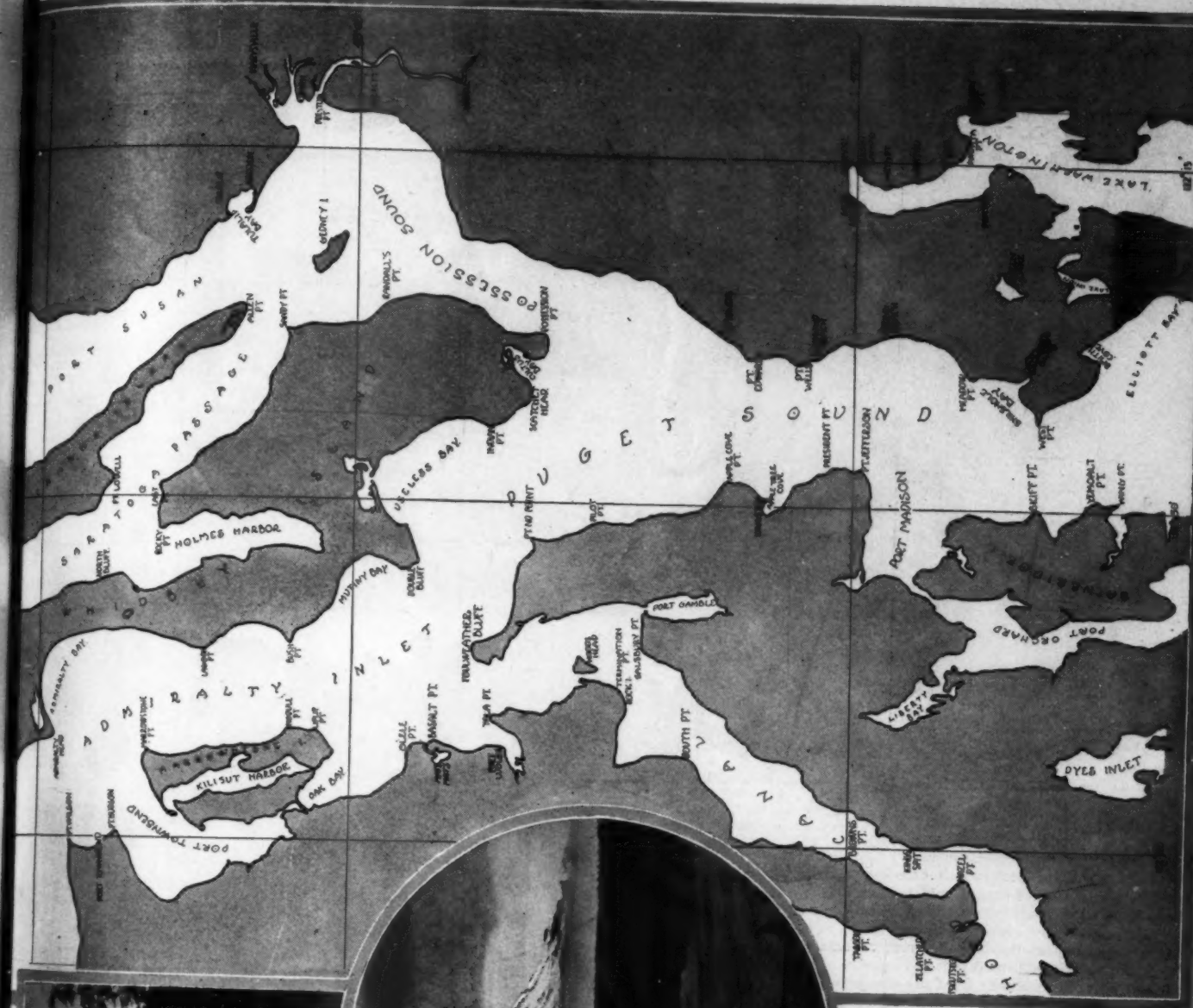
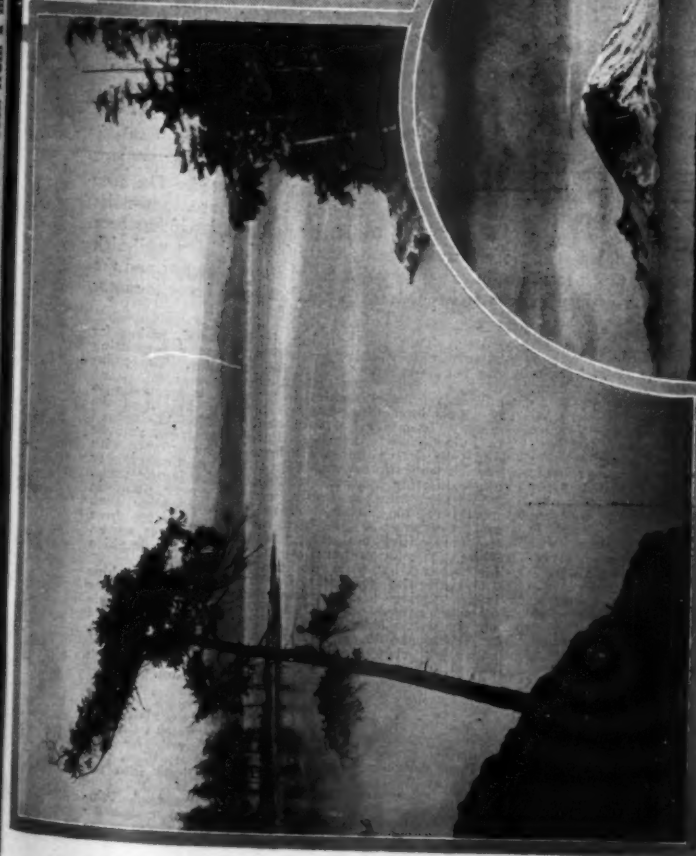


Chart of Puget Sound and adjacent waters showing the great cruising possibilities among the San Juan Islands. Scale of chart as above indicated, 5 miles to the inch



Just one of the thousand harbors in the San Juan Islands

we head out into the bay for the first day's run on the long anticipated cruise.

Out of Seattle we don't have to wait long before the interesting sights commence—let us look backward at the city itself, as we sail away.

A rare sight on a beautiful day is this city built upon the hills, with a skyline that rivals New York.

And away off to the southward is magnificent Mt. Rainier, a perfect cone of pure white 24,000 feet high with its base lost in the blue land-haze of the Cascade foothills.

Mt. Rainier from Seattle Harbor

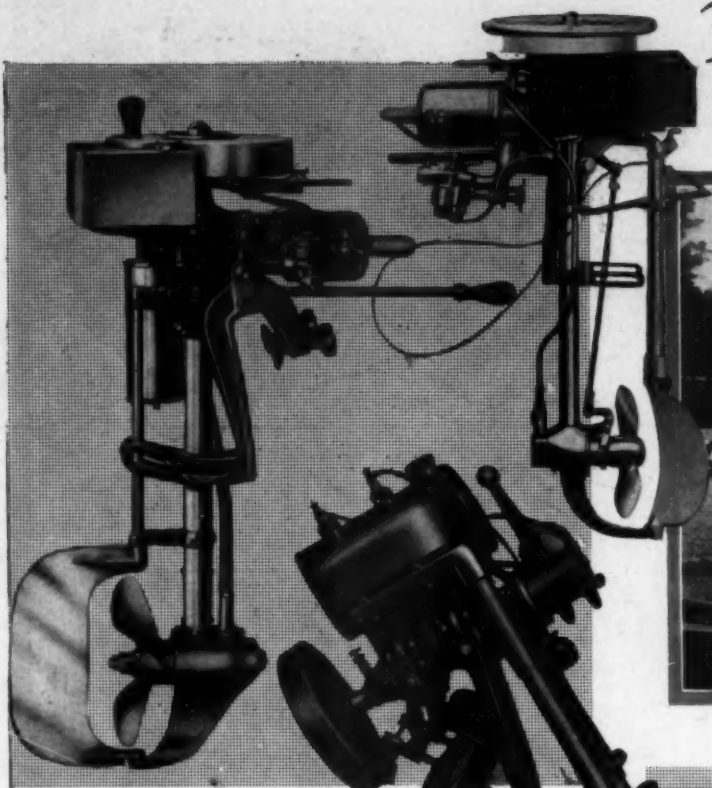
Back of Seattle are the Cascades, peak after peak capped with snow, and all beautiful. To the westward, on the other side of the Sound and facing Seattle, are the wonderful Olympic mountains, a range that rivals in beauty any chain of mountains on this continent. And away off to the northeast we see the gleaming white sugar-loaf cone of Mt. Baker, virgin snow from tip to visible base.

All this beauty of city and mountain and water within the first half hour of our voyage! Is it not an auspicious beginning for a cruise?

We go up to the islands on the inside route this trip, up the east side of Whidbey Island (where we shall hunt deer this fall), up through Saratoga Passage, and around past the Skagit River flats (where we shall go after ducks next spring) chugging away all day long and drinking in the fresh sea air and reveling in the wonderful panorama of shore and mountain as it winds before our eager gaze. Our destination this first night is Cornet Bay, just inside Deception Pass, and there we arrive just at dusk, which, in

(Continued on page 86)

The PHENOMENAL OUTBOARD



Above, an L-A motor and, upper right, a Waterman



TRY as we will we can't help thinking of the outboard motor as a lusty young infant bawling for everything within reach—and getting it. Designed originally for use with the flat-bottomed tub which one finds in the back-waters of civilization its uses have spread until they embrace every conceivable variety of small boat while its field has extended until it covers every navigable water of the globe. It always seems just a year or so ago that the popularity of the outboard motor became an accomplished fact, yet the records tell us that it has been in use for nearly fifteen years and a general favorite for fully five years. But it seems that the detachable motor industry will always remain youthful, always vigorous, always extending its power over this helpless planet.

In view of this we really shouldn't mention that one of the pioneers in this field was described in a technical automobile paper in its fifth issue, over twenty years ago, but it is interesting as history. This pioneer differed in many respects from the types we see nowadays, one of the most noticeable differences being in the location of the cylinder. It was hung outboard, for what reason goodness knows, and it was cooled with spiral springs or fins attached to the casting. Our informant on this point, a present-day manufacturer, tells us that the cooling system was all right as an ornament, but that it didn't cool. One other essential difference between this old-timer and the modern outfits was that it didn't run. However, the designer was a little ahead of his time and deserves a good deal of credit for his inventiveness. It takes more

The Amphion motor, showing its tilting feature, and a fleet of Evinrude-powered rowboats

than one man to bring any mechanical innovation to perfection.

Looking at the detachable motor of today we are amazed at the trouble-saving and improvements with which exhaust has been discommitted on your efficiently cooled—no more burnt fingers; vibration has been well-nigh eliminated, much to the relief of the rowboat and its occupants; and the little matter of ignition has so been studied into that your favorite motor

Miller motor equipped with Bosch ignition

The Michigan is of the combination two and three-port type

convenience—giving him it has been fitted. The open carded—no more anti-noise trail; the exhaust itself has been eliminated, much to the relief of the rowboat and its occupants; and the little matter of ignition has so been studied into that your favorite motor

Waterman

Some very important changes have been made in the 1916 model of the Waterman portable engine, made by the Waterman Motor Co., of Detroit, Mich., which are calculated to add at least 40 per cent. to the life and general efficiency of the machine. The main changes are in the lengthening of all bearings, the adoption of a special built-in flywheel type magneto and the changed design of the gasoline tank. The bearings will be increased in length from 15 to 20 per cent., which may be considered a very important improvement when it is realized that in a good many detachable engines the entire weight of the flywheel and crankshaft is taken on the lower bearing of the crankcase. However, in this motor there is a thrust bearing running in oil which carries this weight, but the increased length of bearings helps out by elimination of vibration. The material of the gasoline tank is of a higher grade and the capacity is practically double that of the tank furnished in 1915.

The flywheel magneto is a very important change and one which has not been made until the makers felt sure that they had procured a built-in magneto equal in standard to the rest of the motor's equipment. It has been experimented with for a period of more than two years and the manufacturers announce their readiness to stand back of it to the limit.

As is well known the Waterman marine motor is rated at 3 h.p. at 1,000 r.p.m. It has a single cylinder whose dimensions are $3\frac{1}{4} \times 3$ inches bore and stroke and the weight of the complete machine is 58 pounds.

Lockwood-Ash

The aim of the Lockwood-Ash Motor Co., of Jackson, Mich., in manufacturing its L-A rowboat motor, is to make it a really serviceable power plant to take the place of oars and which may be carried without difficulty and operated without a vast understanding of machinery. It is simple in construction, although fitted with the latest improvements and is declared to be so durable and reliable that it will more than compensate the owner for his investment. It is made in only one size—2 h.p., $2\frac{1}{4} \times 2\frac{1}{2}$ -inch cylinder—but either battery or magneto ignition will be supplied. When the former is wanted three Columbia dry cells are provided, with a special non-vibrating coil, having wires and terminals all attached ready for use. For the magneto outfit the manufacturers employ an efficient flywheel instrument which consists of a fixed magnet securely fastened within an aluminum shell forming the flywheel. This magnet revolves around an induction coil mounted on a movable platform which also carries the condenser, circuit breaker, advance and retard lever and the stopping switch.

The motor being reversible it can be operated to drive the boat either forward or backward without the interposition of a mechanical reversing device, and steering is effected by means of a rudder. The propeller furnished is a 9 x 14-inch weedless, allowing the motor to operate at about 800 r.p.m.

Machek-Amphion

This motor which is built by A. J. Machek & Co., of Milwaukee, Wis., differs from all others at present on the market in that its two cylinders are mounted vertically as in an ordinary inboard

motor. This construction, it is stated, makes for balance and positive reversing, thereby permitting the successful use of a solid propeller. The cylinders are fitted with a copper water jacket, which not only allows repairs in case of a freeze-up to be easily made but keeps down the weight of the motor. In general design the Amphion is declared to follow closely the best French practice, and we find that the cylinders are bored in accordance with French measurements, being 63.5 millimeters, or approximately $2\frac{1}{2}$ inches. The stroke is the same.

The Amphion is really a unit power plant in miniature, as the motor, magneto, gasoline tank and reverse gear are integral and separable from the part which makes it purely a row-boat motor. This construction permits the use of the Amphion for other than marine practices.

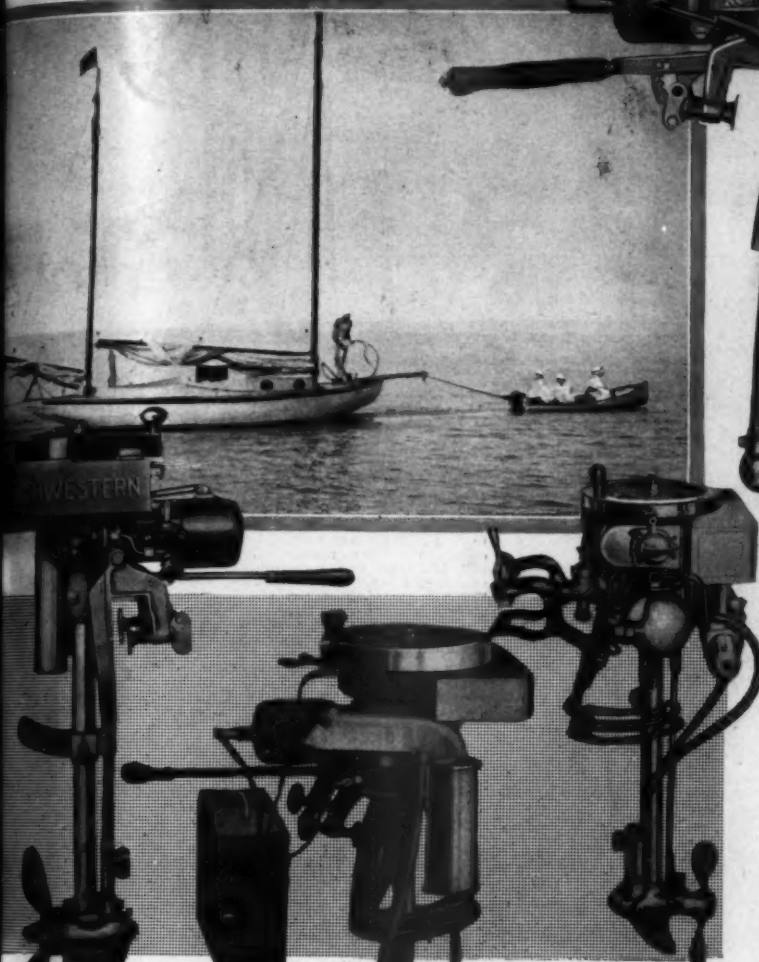
One of the foremost features of this machine is its tilting arrangement whereby the propeller may be raised out of water when the engine is not in use. This feature will also be appreciated by those who have to contend with shallow water, rocky or stumpy places and frequent portages. The Amphion can also be locked to the boat with which it is used, rendering it thief-proof.

Evinrude

So much has been said and written about the general features of the new four-cycle twin detachable rowboat motor manufactured by the Evinrude Motor Boat Co., of Milwaukee, Wis., that it might be interesting to delve a little into the details of construction.

Its ignition, of course, is of the standard Evinrude design—Evinrude built-in flywheel magneto—and a brass casing thoroughly protects the arma-

GROWTH of the MOTOR



A choice of three types of ignition is offered with the Northwestern

Several new features are supplied with the Motorgo

will start on the keep running until line in the vicinity hausted—which is an extreme-occurrence, as the motors more on faith and good-nature than on fuel.

And in addition to all this we have been blessed with motors having air propellers, two-cycle motors with two cylinders horizontally opposed,

The Arrow is a two-cylinder machine distinguished by a non-backfiring arrangement

first turn and all the gaso-has been ex-ly improbable seem to run

ture, making it entirely insulated and water-proof. Instead of being immediately opposite, the cylinders are slightly offset, doing away with the necessity of bent connecting rods which might tend to produce side thrusts and high bearing pressure. The bearings used are amply large.

Perhaps the most unique feature in the construction of the motor is the oiling system. Due to the fact that the crankshaft stands in a vertical position, with the cranks traveling in a horizontal plane, and for other reasons peculiar to outboard motor design, the ordinary method of splash or force feed lubrication was found to be insufficient. The oil, therefore, is mixed with the gasoline, which is taken in through the crankcase, as is the common practice with small two-cycle motors. However, a different principle is involved in this case, as there is no necessity for crankcase compression, and a check valve in the carburetor is used only to keep the latter from leaking gasoline. In addition to its lubrication features, a great advantage of this type of fuel feed is that the outward stroke of the two pistons occurs simultaneously, thus forcing double the volume of gas mixture from the base into the cylinder which is ready for its compression stroke. This action, it is declared, approaches very closely the ideal condition of having a full charge of gas at atmospheric pressure in the cylinder before compression.

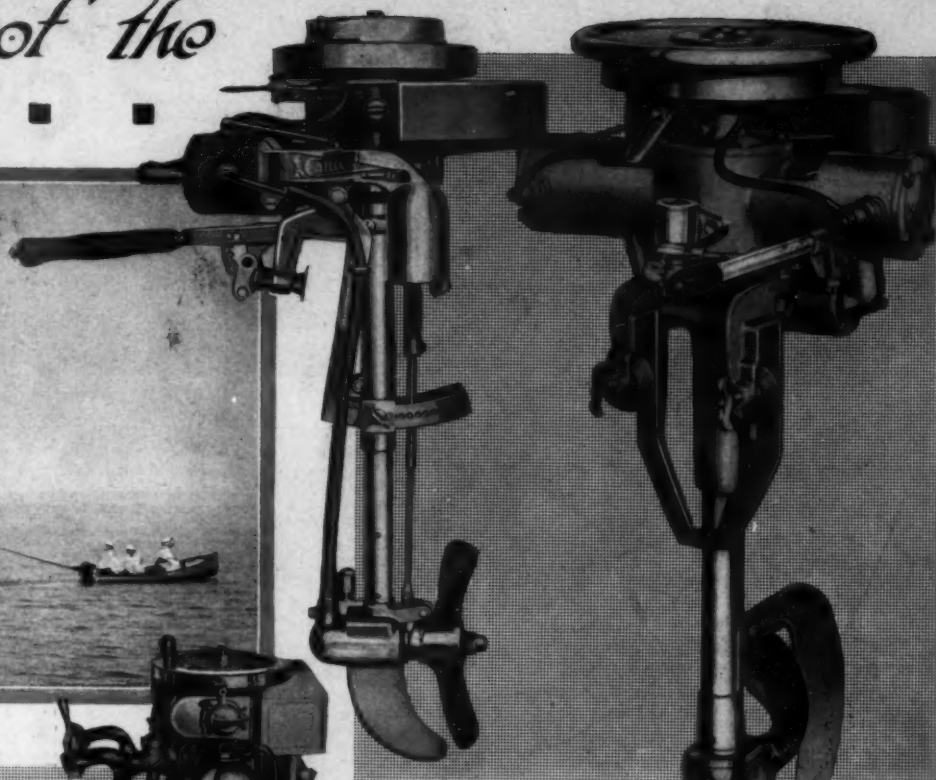
Miller

The Miller detachable boat motor, built by the Miller Gas & Vacuum Engine Co., of Chicago, Ill., was first put on the market in the summer of 1913, and has since been subject to numerous improvements. It is, like the majority of this type,

of the two-cycle principle, and it is rated to develop 2 h.p. at 900 r.p.m., with a speed range from 300 to 1,000 r.p.m. It can be attached to any boat with a flat stern up to 2 1/4 inches in thickness, and may be made adaptable to boats of the pointed stern type by the use of a special bracket. Features of the construction of this motor include cylinder of semi-steel with the water-jacket cast integrally and the water supplied by a plunger pump located on the propeller gear housing; crankshaft of chrome nickel steel ground to size with large main bearings; connecting rod and crankcase of phosphor bronze; carburetor of special design, adjustable for all conditions; and Bosch water-proof high tension magneto ignition.

Michigan

The Michigan rowboat motor, which is the product of the Michigan Wheel Co., of Grand Rapids, Mich., has a cylinder measuring 2 1/2 x 2 1/2 inches, and is declared to develop 2 actual h.p. at 900 r.p.m. The weight is 50 pounds, and the motor is made of the very best material and workmanship and is fully guaranteed. It is of the combination two and three-port type. The regular ignition outfit which is supplied consists of a non-vibrating spark coil, three batteries encased in a water-proof box, and a specially designed timer. A rubber spark plug cover is furnished to protect the spark plug and terminal from spray. The propeller wheel is 9 1/2 inches in diameter, of the weedless type, is made of special propeller wheel bronze and is protected by a fin to ward off the blow of any underwater obstruction. If desired, a high tension magneto may be supplied at an extra cost, and it is also possible to obtain an under-



In the upper picture we have the famous Five-Speed Caille, while to the left we see a husky little Sweet giving first aid to a becalmed yawl

The Ko-ban has two horizontally opposed cylinders which fire simultaneously

four-cycle motors built the same way, machines having mechanical reverse, those reversing automatically, and finally models which, if not self-starting, reduces the labor of cranking to an insignificant minimum.

And because of all this the industry has grown until something like 300,000 outboard motors are in operation in this country alone. There you have the importance of them—600,000 h.p. wrapped up in small packages capable of being toted around the country by hand, wagon or automobile, and converted into speed with a mere twist of the wrist. While the industry has been growing, too, it has been carrying along with it another, that of building small boats which will give the motors full exercise of their capabilities. It's really an endless chain: first, the outboard motor, then the boat to fit it, next the bigger motor to drive the better boat, and after that a bigger boat to suit the better motor. We are unaware of where it will all end, but we know that with the large variety of detachable motors on the market there is no longer an excuse for rowing. The accompanying photographs and descriptions make plain some of the more prominent makes which are offered, and it will readily be seen that the choice is great enough to suit everyone. The aim in preparing these descriptions has been to give the salient features of outboard motor design in the various makes without undue reiteration.

water exhaust and a quick detachable bracket for pointed stern boats.

Sweet

The Sweet Mfg. Co., of Detroit, Mich., manufactures outboard motors in two sizes—2 and 4 h.p.—and recommends them for use with rowboats, sailboats, canoes, etc. As a matter of fact, it has received communications from many of its customers, telling how these motors have been found adaptable to small ferries, freight boats and craft of many other types. These motors are equipped with a rudder having tiller lines, so that it is possible to steer the boat from any position, and the 4 h.p. machine will be equipped with a reversible propeller if desired. Owing to the design and balance, it is declared that the Sweet develops practically no vibration, and will show in some cases a gasoline consumption of only one gallon for 20 miles of operation. The 2 h.p. machine weight 63 pounds, and the 4 tips the scales at 70 pounds.

Northwestern

In designing and equipping its new model, the Northwestern Motor Co., of Eau Claire, Wis., has made it as simple of operation as is possible and is furnishing it complete with all necessary equipment to attach to any rowboat. The motor is of the single-cylinder two-cycle type, and has a bore of 2 1/4 inches by a stroke of 2 1/2 inches; the weight is 60 pounds. It is furnished with battery ignition, with a Bosch magneto or with a built-in fly-wheel magneto, according to the preference of the customer.

Motorgo

The Motorgo is a high-grade rowboat engine of-



The Gray Gearless which uses a flexible vanadium steel shaft

ffered by Sears, Roebuck & Co., of Chicago, Ill., which can be attached to any small boat. It is furnished with complete equipment, and is very simply started and operated, so that it can be run by practically anyone. Although the cylinder dimensions are $2\frac{1}{4} \times 2\frac{1}{2}$ inches, the makers are very conservative in their power rating, listing it at only $1\frac{1}{2}$ h.p.

Among the interesting details of the equipment is the exhaust manifold, which is water-cooled. The motor is equipped with a plunger pump located on the gear housing, which forces the water for cooling the cylinder up through a rubber hose to the bottom of the exhaust manifold and out through the muffler, doing away with the tubing ordinarily used for this purpose and making a much cleaner looking outfit, as well as a quieter engine. This construction is also stated to add to the efficiency of the engine, as the cooling water is warmed by the exhaust, which keeps the cylinder at an even temperature, developing more power on less gasoline than when the water is pumped directly from the lake to the cylinder.

The cylinder, piston and flywheel are made of a very high grade of gray iron, and the cylinder and piston are both carefully ground; the piston is fitted with two lapped rings. The connecting rod is made of high-grade phosphor bronze, and the crankshaft is of carbon steel, heat-treated. The crankshaft bearings are phosphor bronze bushings pressed in so that in case of wear new bushings may be put in at small cost. The Motorgo is equipped with a bronze weedless propeller, $9\frac{1}{2}$ inches in diameter with 14-inch pitch, drawing from 9 to 10 inches of water. The propeller, rudder and gear housing are made of bronze, so that the outfit can be used in either fresh or salt water.

Arrow

One of the newest outboard motors on the market is the Arrow, manufactured by the Arrow Motor & Machine Co., of New York City. This is a 4 h.p. machine, having two cylinders with $2\frac{1}{4} \times 2\frac{1}{2}$ -inch dimensions. A feature of the construction which is particularly noteworthy has to do with the elimination of back-firing, so that the motor can be throttled down without inconvenience to give a boat speed of less than a mile an hour. This non-backfiring feature is obtained through designing the cylinders with a double system of ports to obtain full power from each new fuel charge and prevent the wastage of energy through the exhaust. Another important feature of the Arrow is its handy weight—despite the twin-cylinder construction, it weighs only 90 pounds.

The cylinders, pistons and rings of this machine are made of a special alloy composed of iron, vanadium, titanium and steel, giving toughness which assures longevity. The crankshaft is of chrome nickel steel, heat-treated, and the main bearings are $\frac{3}{4}$ of an inch in diameter and 4 inches long. The crankcase is made of a special alloy of aluminum, which is declared to resist the action of salt water and acids. The bearings and connecting rods are of phosphor bronze, accurately fitted, and can be easily removed. The two halves of the crankcase are joined with a tongue and groove, in order to prevent leakage from without or within.

The ignition system is a special high-tension Bosch shock-proof and waterproof magneto, mounted where it is easily accessible. This instrument is compact, of light weight and needs little attention.

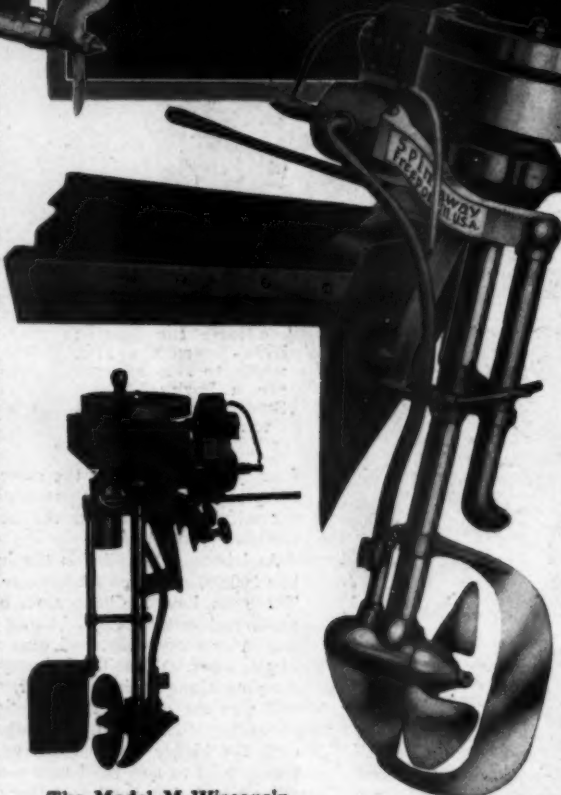
In addition to the two-cylinder motor there is a one-cylinder $2\frac{1}{4}$ h.p. Arrow.

Caille

One of the most important improvements effected in the 1916 model of the Caille Five-Speed portable motor is the starting device, which is declared to eliminate entirely any annoyance hitherto experienced in cranking a motor of this type. This



The Model M Wisconsin which has an exclusive adjusting feature

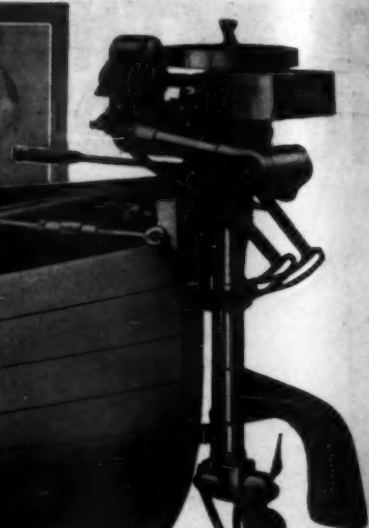


The Spinaway, showing the underwater exhaust

starter is located on top of the flywheel, and is operated by a light pull on a handle which is connected by belt and spring to the flywheel. A line may be attached to the handle and led around the coaming, making it possible to start the motor from any point in the boat. Another feature of this motor is its ease of operation, the gasoline supply being easily and instantly adjusted by turning a small numbered dial on the carburetor. A small lever conveniently located on the front of the motor increases or decreases the operating speed.

Perhaps the most important improvement to this machine, however, lies in the five-speed control, from which the motor takes its name. By the up and down manipulation of the lever by which the boat is steered, it is possible to obtain two forward and two reverse speeds and a neutral position. The motor is fitted with a reversible propeller, and by an ingenious arrangement of the aforementioned lever the position of the blades is changed. Also in the 1916 model the water-cooled exhaust has been so improved that it is possible to handle the motor freely directly after it has been running for long periods. With the new construction the entire exhaust manifold and muffler is a one-piece water-jacketed aluminum casting. It is said that the introduction of water to the exhaust pipe not only cools the motor but eliminates noise and unpleasant odors. A cut-out is provided, so that the operator can tell whether the motor is exploding on every revolution. The gasoline tank has been reinforced in the new model and is provided with an oil measure.

The Caille portable motor, which is manufactured by the Caille Perfection Motor Co., of Detroit, Mich., is not intended for heavy commercial work, but is designed solely for pleasure purposes, and is made light in weight, so that the owner may carry it around with him and affix it to any skiff or flat-bottom boat which happens to be handy.



At the left, an Aerothrust in position and, above, the Ferro with its new attaching fixture

Koban

This motor, which is the product of the Koban Mfg. Co., of Milwaukee, Wis., is classed as the first rowboat motor with two cylinders, and it differs in other respects from other detachable models. The two cylinders are horizontally opposed and fire simultaneously, thus neutralizing the vibratory effects of the impulse strokes and giving smooth-running, well-balanced operation. The speed range of the Koban is regulated by a timer lever conveniently located below the flywheel. With this the motor can be slowed down to less than two miles an hour, or can be speeded up to its maximum with great celerity. The machine develops more than 3 h.p. at a speed of 900 r.p.m., and carries a 10 x 16-inch propeller, which is declared capable of giving an ordinary 16-foot rowboat a speed as high as 12 miles per hour. Some of the mechanical features are as follows:

The crankcase and cylinders are made of the best semi-steel in a single unit casting, which overcomes any possibility of misalignment. The cylinders are cooled by large, unobstructed water jackets, which are an integral part of the casting. An improved water-tight thrust adjusting gearcase is used which is designed for extreme service. The lower section of the gearcase contains the working parts, the propeller shaft running from end to end and extending through one end for attaching the propeller. The propeller shaft is supported on each end by a long bearing, and there is also a bearing between the driving gear compartment and the water pump compartment. Any wear caused by end thrust can easily be adjusted when necessary by loosening a lock nut and regulating the thrust bearing.

Gray Gearless

The outboard motor manufactured by the Gray Motor Co., of Detroit, Mich., differs from all others in the driving arrangement, there being no gears used with this motor. Instead a flexible shaft of chrome vanadium steel turning in a heavy curved bronze tube is used. This flexible shafting operates in grease at all times, and the whole driving mechanism is amply protected from wear and tear and from unusual shock. A solid wheel is used with the Gray Gearless, and a rudder is fitted in the inside curve of the drive shafting where it cuts the water ahead of the propeller. Another one of the features of the Gray is its aluminum crankcase, which not only reduces the weight of the motor but, it is said, increases the life of the outfit and prevents leakage. The main bearings are made of bronze and are removable and interchangeable.

A polished brass silencer which causes no back pressure is used, and the equipment includes a valveless circulation pump. The pump is of the eccentric type, operated by the propeller shaft, where it passes through the pump chamber. The propeller is made of bronze and is of the weedless type.

Aerothrust

The Aerothrust Engine Co., of Lockport, Ind., manufactures an attachable motor which is unique in that it is equipped with an air instead of a water propeller. This design permits the motor to be attached to practically any type of boat, from a square stern rowboat to a barge. It also permits the boat to operate in extremely shallow or weed-filled water, where navigation would be difficult with a submerged propeller. In addition, the Aerothrust may be used in connection with bobbeds or iceboats, with which equipment it is stated to have attained speeds as high as 45 miles per hour.

The motor is a two-cylinder horizontally opposed machine, with bore and stroke of $2\frac{1}{4} \times 2\frac{1}{2}$ inches, and with a range of speed from 700 to 2,200 r.p.m., 3 h.p. being developed at 1,800 r.p.m. The pistons are of cast iron and, although wonderfully strong, are unusually light, permitting high rotative speeds. The crankshaft is forged in one piece from a steel of special analysis and turns on high-grade babbitt bushings of large area. The air propeller is of the best selected walnut, 35 inches in diameter, with a metal hub. Although not shown in the illustration, it is now protected by a metal guard, which prevents anything coming in contact with the blades. A high-tension waterproof built-in magneto is used.

(Continued on page 50)

Gasoline In Abundance Possible

The Rittman Process for Cracking Crude Oil and the Heavier Distillates Into Motor Gasoline—
What It Is and What It Means to the Owner of a Marine Engine

By Alfred F. Loomis

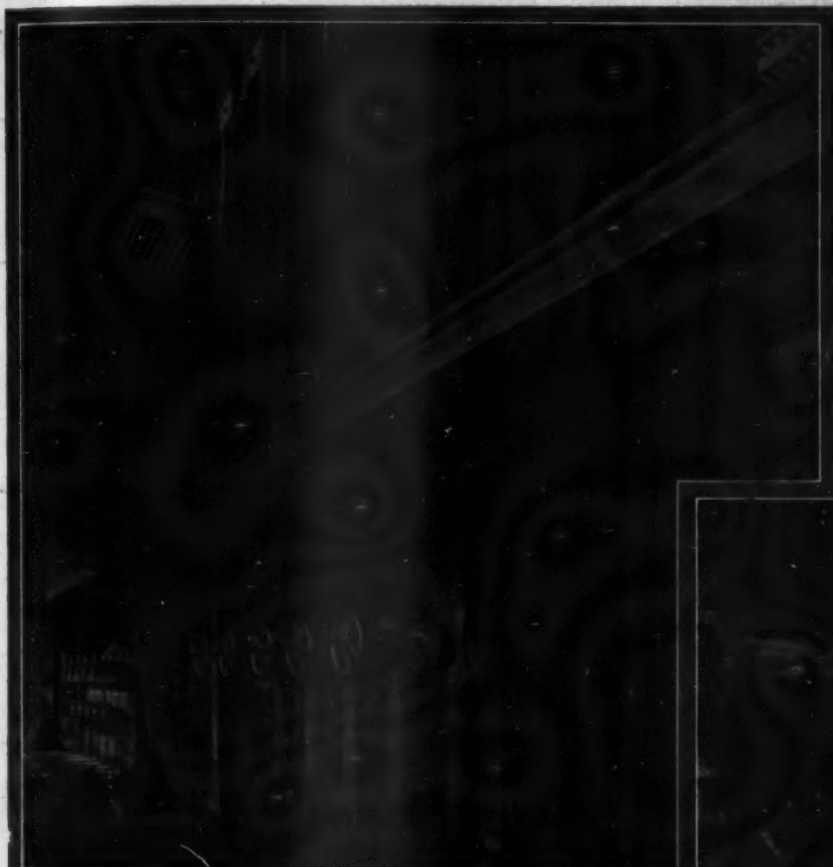
(Photographs by courtesy of the Bureau of Mines)

A LITTLE over a year ago the morning papers heralded the completion of a series of laboratory experiments conducted at Columbia University by Dr. Walter F. Rittman, then of the United States Bureau of Mines, which had proven conclusively that

the beneficence of the Government in giving the patents to the public, there are no less than seven plants in course of construction and it seems as though the production of these and others which will soon be built would have an appreciable effect on the cost of

crude sold for thirty-five cents a barrel, and in 1914, at which time the number of automobiles in service had increased from 500,000 to nearly 2,000,000, the price soared to \$1.08 per barrel. But the stupendous pool at Cushing was at its prime at this time, and when war broke and the exportation of petroleum products was temporarily suspended, its daily output of 300,000 barrels helped to pile up an unprecedented stock above ground, and the bottom went out of the market. In the latter part of 1914, therefore, the price of Oklahoma crude went back to thirty-five cents a barrel, and for the next six or eight months the motor boat owner was in his hey-day with gasoline retailing at prices as low as nine cents a gallon.

But life is full of trials and tribulations, and the good fortune of the boating and automobiling fraternity waned with the petering out of the mid-continent fields, particularly the famous Cushing pool where daily production dropped to 95,000 barrels. As the war progressed, too, it was found that the demand for gasoline and other petroleum products abroad was even greater than it had been in times of peace, and to this unfortunate combination of circumstances we must attribute



Ground floor of the furnace building, showing the arrangement of the furnaces for heating the cracking tubes. The pictures on these pages were taken at the experimentation plant at Pittsburgh

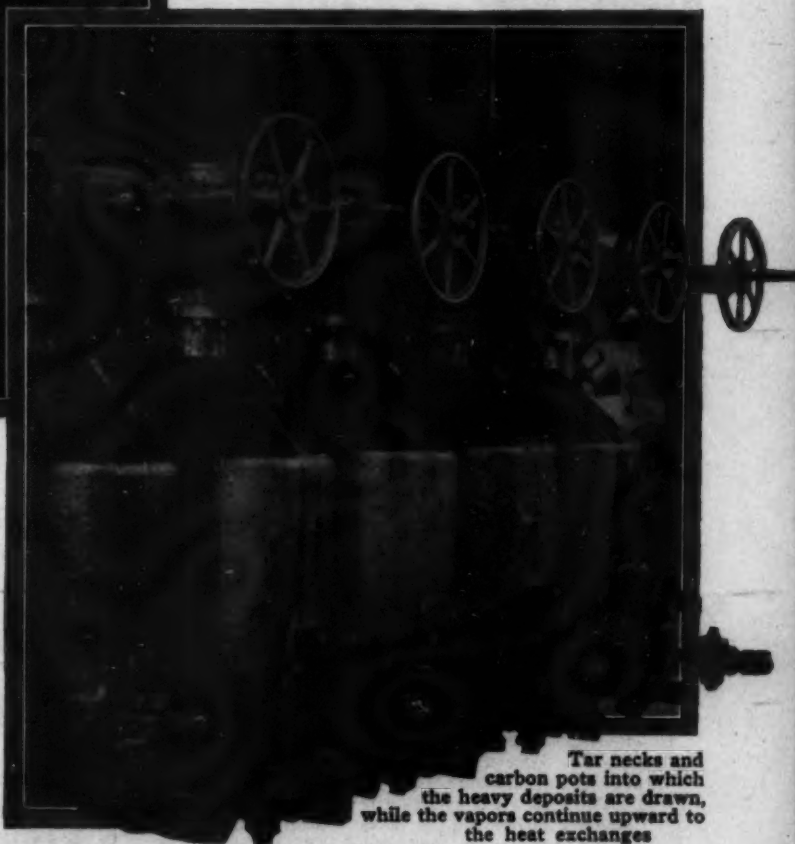
the system now employed by the leading oil refiners of cracking petroleum for the production of gasoline in no way approaches the top limit of efficiency. Dr. Rittman proved this by inventing a process of his own which yielded a quantity of gasoline from two to four times greater for a given amount of crude than that extracted by the other, or Burton process. The importance of this invention was thoroughly appreciated in engineering circles at the moment of its announcement, but the general motor boating public, lulled to indifference by the downward trend of the price of motor fuel, was inclined to dismiss the subject as "another one of those newspaper stories."

Luckily for us, however, the Bureau of Mines looked a little into the future, and almost immediately entered into contract with a private concern for the erection of a plant for experimentation and production of gasoline by this process on a commercial scale. So carefully and diligently was the work carried out by Dr. Rittman and his associates that the initial stages of disheartening and costly failure were soon over with, and the new cracking system was put on a working basis before the end of the year. Now, thanks to

gasoline. Using the undoubted success of this new system as a working point it is interesting to study into the causes which have led to the present high price of gasoline and the outlook for the future.

The bulk of gasoline-yielding crude petroleum has come, for the last six or seven years, from what is known as the mid-continent field, a region which embraces Oklahoma, Kansas, Louisiana and northern Texas, and in the period from 1910 to 1914 production rose in this belt from 59 million barrels of crude annually to 118 million barrels. Automobile and motor boat production expanded just as rapidly in this period, however, and the oil operators were never able to get ahead of the demand. As an indication of this the following figures for the price of crude oil per barrel are illuminating: In 1910

the prevailing prices of gasoline, with crude selling at about \$1.35 a barrel. However, that there is hope for the future in the matter of increased productivity we may positively assert, for never before has test drilling for new wells been conducted on such a mammoth scale as is now being done, while we are informed that relief may already be on the way from the central Arkansas valley where a healthy boom is just now in progress.



Tar necks and carbon pots into which the heavy deposits are drawn, while the vapors continue upward to the heat exchanges

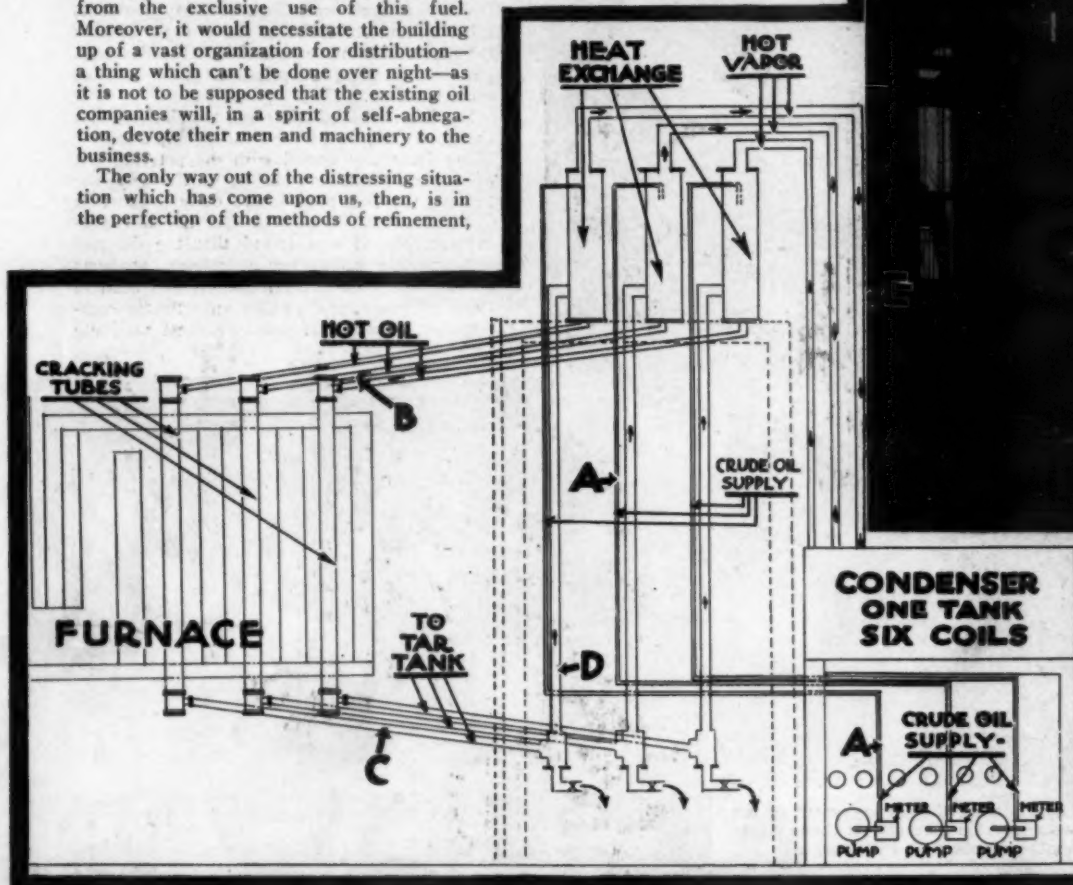
But the supply of petroleum in the earth is at best limited and it is not to new fields that we must look for decreased prices as much as to improved methods of refinement which will permit the extraction of a greater amount of gasoline from the available crude. The answer does not seem to lie even in kerosene, for there are now fully half a million gasoline marine motors in operation and there has been no really satisfactory device yet invented by which these motors may be started without the aid of their intended fuel. The future may bring forth a motor which will operate on kerosene at all speeds and under all conditions as efficiently as do the present types on gasoline, but even should the success of this uninvented motor totally eclipse its predecessors, years must elapse before the latter are forced out of service by wear and cease to be a factor in the fuel situation.

Neither can we look to alcohol as a remedy, as it has been estimated that it would require all the corn and potatoes produced in this country to supply the demand resulting from the exclusive use of this fuel. Moreover, it would necessitate the building up of a vast organization for distribution—a thing which can't be done over night—as it is not to be supposed that the existing oil companies will, in a spirit of self-abnegation, devote their men and machinery to the business.

The only way out of the distressing situation which has come upon us, then, is in the perfection of the methods of refinement,

hydrocarbons—gasoline, kerosene, the turpentine substitutes, etc.—would pass off in the same way. However, the demand for gasoline has made it necessary to extract more of this cut than would be given off under the normal conditions of atmospheric pressure and a slowly rising temperature, and this demand has led to the development of the cracking process. The first instance of cracking occurred quite accidentally, by the way, but that is another story.

The hydrocarbons present in petroleum are distinguishable to the scientist as molecules of different sizes, those composing the more volatile constituents being smaller than those of the heavier groups. The tendency of the hydrocarbon molecules to break



Arrangement of condensers for multiple-tube furnaces

up upon the application of heat and the fact that the heavier molecules become dissociated more easily than the lighter ones make possible the cracking process.

However, dissociation will not take place to any

(Continued on page 50)

Plan of the Rittman cracking plant, a description of which appears in the accompanying article

and a shorter way of saying this is—the Rittman process. As this process is one which will undoubtedly be spoken of more and more generally in the future it is well to know something more of it than the mere name. To understand it thoroughly, however, we should first go over the principles underlying the process of cracking.

To begin with, petroleum is an organic substance composed largely of the chemicals carbon and hydrogen, and these hydrocarbons, as they are called, have varying boiling points, making possible their separation into the products which we know by the differences in their specific gravity as gasoline, kerosene, lubricating oils, etc. When the temperature of the still rises to a certain point the lightest component hydrocarbon vaporizes and passes off in a gaseous state (later to be condensed to liquidity by the application of cold) and if the temperature were gradually raised with the pressure atmospheric, the various other hy-



A view of the pumps and other apparatus used to feed the oil into the cracking tubes



Florinor is a 52-foot houseboat cruiser having good speed and ample accommodations below decks

FLORINOR is a 52-foot houseboat of the cruiser type, built last summer by A. Hansen, of Brooklyn, N. Y., and now just commencing her second season in Baltimore waters. She is an able boat with good



Looking aft in the main saloon

Photographs by Rosenfeld

room opening off it. Entrance to the owner's quarters is by stairway leading down from the deck to the main saloon. Forward of the saloon is an exceptionally large galley equipped with icebox,

plate racks and Perfection range. A skylight forward of the bridge deck opens partly over the galley and partly over the engine-room immediately forward. Crew's quarters are provided in the forecabin.



A four-cylinder 37 h.p. Standard motor is installed, controlled from the bridge deck

beam—14½ feet—and her 37 h.p. four-cylinder Standard motor gives her a cruising speed of 9 or 10 miles an hour.

Florinor, which is owned by Moses Morris, of Baltimore, is laid out with the owner's stateroom extending the full width of the boat aft, and the main saloon amidships, being separated from the after compartment by a short passage having a toilet and a store-



The owner's stateroom, which occupies the after end of the boat, is a large compartment fitted with two full width beds. A storeroom and the toilet are immediately adjacent to it

A Pacific Coast Sixty-Footer

THE accompanying illustrations depict Olive, a 60-foot cruiser, which is typical of the best work that is being done on the Pacific Coast. She was designed by Lee & Brinton, of Seattle, and was built at the John Wilson Shipyard, in the same city, for A. W. Leonard, President of the Puget Sound Traction, Light & Power Co. Olive has a beam of 12 feet and a draft of 4½ feet, and she is of the modified raised-deck type with pilot-house. A special feature of her, as compared with other boats of the same type which have been produced by these architects, is the trunk cabin over the main

next to the main saloon, which latter is very conveniently arranged and is provided with a separate entrance from the deck. The owner's stateroom is entered from the passageway through double sliding doors, so that this space can be opened up into one large compartment.

There is a private toilet adjoining the owner's room and there is also one opposite for the guests. In the passageway opposite the owner's room there are upper and lower berths, which are curtained off.

The forward section, containing the engine-room, forecabin and crew's toilet is separated from the rest of the boat by a steel watertight bulk-

Olive is a good example of up-to-date practice on the Pacific Coast. She is in use on Puget Sound

The trunk cabin over the saloon is of sufficient height to allow the occupants, while seated inside, to look out on both sides and aft

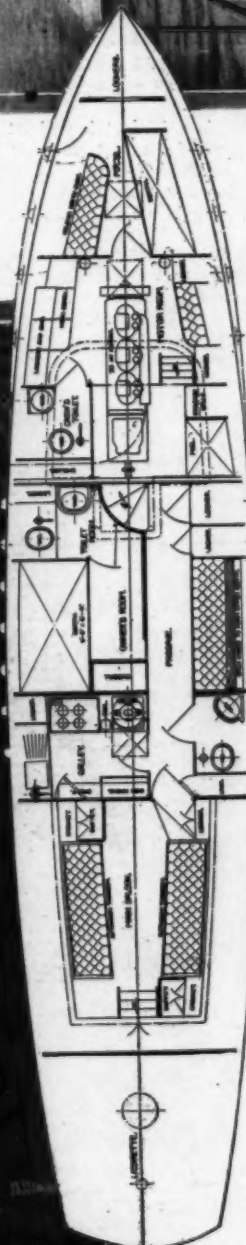
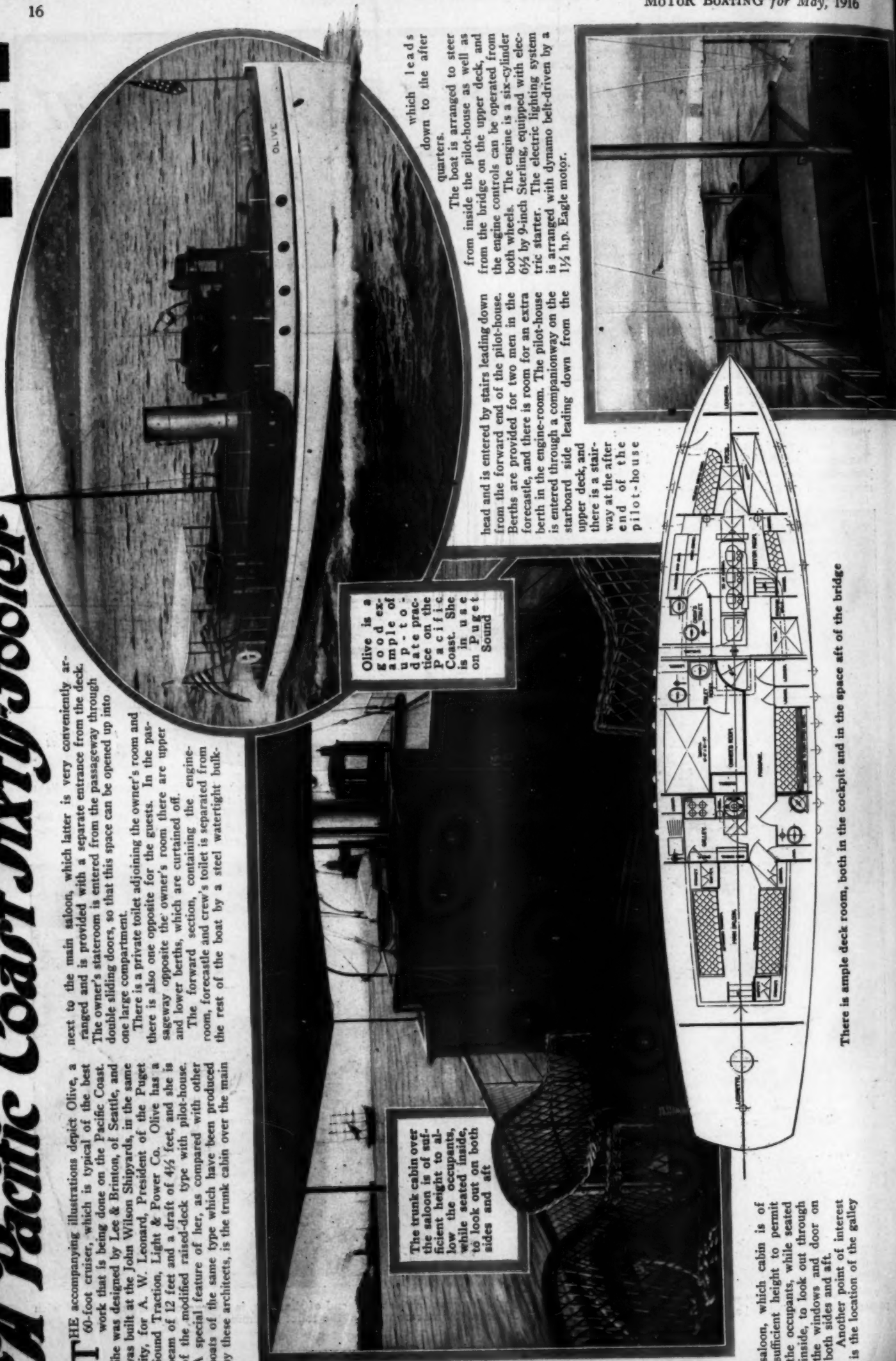
which leads down to the after quarters.

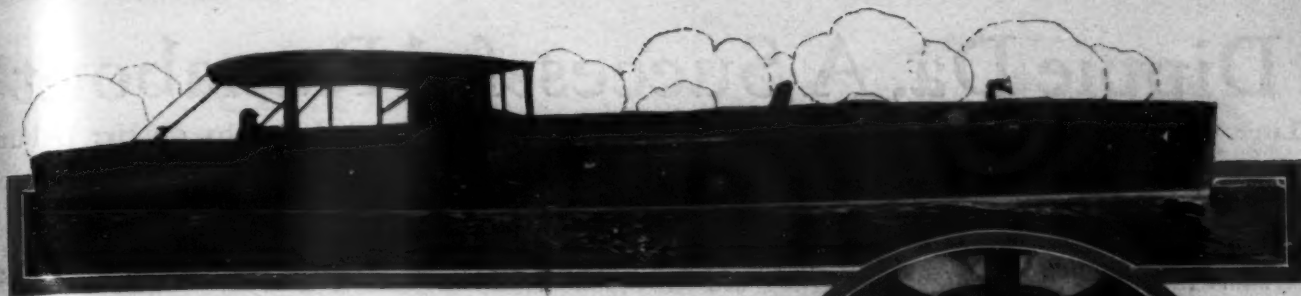
The boat is arranged to steer from inside the pilot-house as well as from the bridge on the upper deck, and the engine controls can be operated from both wheels. The engine is a six-cylinder 6½ by 9-inch Sterling, equipped with electric starter. The electric lighting system is arranged with dynamo belt-driven by a 1½ h.p. Eagle motor.

head and is entered by stairs leading down from the forward end of the pilot-house. Berths are provided for two men in the forecabin, and there is room for an extra berth in the engine-room. The pilot-house is entered through a companionway on the starboard side leading down from the upper deck, and there is a stairway at the after end of the pilot-house

saloon, which cabin is of sufficient height to permit the occupants, while seated inside, to look out through the windows and door on both sides and aft. Another point of interest is the location of the galley

There is ample deck room, both in the cockpit and in the space aft of the bridge





Ace was built by the Mathis Yacht Building Co., with a guaranteed speed of 32 miles per hour. This she has easily exceeded

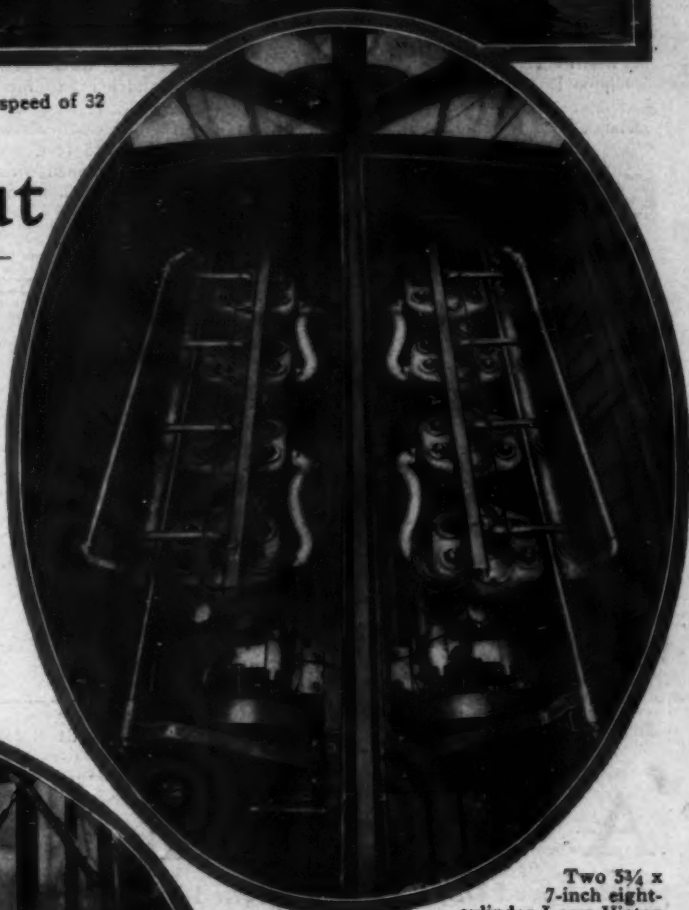
A Speedy Runabout

Ace, Built of Mahogany for Commodore Drexel—
Equipped with Two Eight-Cylinder Loew-Victors

ONE of the finest motor boats of last season's vintage is Ace, a sea-going runabout, designed by Bowes & Mower, for Commodore G. W. Childs Drexel, of Philadelphia, Pa., and built by the Mathis Yacht Building Co., of Camden, N. J. Ace is unusual not only for her length, which is 48 feet 8 inches over all and 48 feet on the waterline, but for her power, which consists of two $5\frac{3}{4}$ by 7-inch eight-cylinder Loew-Victor motors, developing 184 h.p. each at 1,250 revolutions per minute. Built with a guaranteed speed of 32 statute miles per hour, Ace has easily exceeded this figure, thanks to the efficiency of these powerful motors. It is expected, too, that when the boat is launched in the spring she will show a speed in excess of 34 statute miles on being put through

apart. The engine keelsons, bilge stringers, hogging stringers, clamps, etc., are all in single lengths and extra heavy, as they are depended upon for the structural strength of the boat. The decks are of mahogany, and the other details of her finish are as fine as it is possible to make them.

This speed boat is arranged with the two mo-



Two $5\frac{3}{4}$ x 7-inch eight-cylinder Loew-Victor motors, developing 184 h.p. each, are installed

Naturally, the motor controls are brought to the helmsman's position, and the engine compartment bulkhead with its dials, switches and buttons in duplicate, is among the most interesting features of the boat. The two motors are equipped with electric starters, but hand crankers are also installed.



Photographs by Pearce

The helmsman's cockpit, with its instruments for double control, is an interesting feature

her formal trial paces. These are being deferred until this season because she was put into service immediately after completion last year, the owner not wishing then to concede the time for a progressive speed trial.

Ace has an extreme breadth of 7 feet 9 inches and a greatest draft of 2 feet 6 inches, with 1 foot 6 inches as the draft of the hull. She displaces 11,000 pounds. The hull is quite heavily built for a boat of her type, being double-planked with $\frac{3}{8}$ -inch mahogany on the outside, and $\frac{1}{4}$ -inch cedar on the inside. All the frames are $\frac{3}{4}$ x $\frac{3}{4}$ -inch selected white oak, spaced 10 inches center to center, except in the engine compartment where for greater strength and rigidity they are spaced 6 inches

tors forward under hinged hatches, and the cockpit commencing a little aft of amidships. A large folding windshield, which furnishes ample protection to the helmsman and the other occupants of the cockpit is installed, and there is a folding automobile type top to further shield them from the elements.



Locking through the Raritan Canal on the way to North Islesboro, Me.

Dippie Da, A Successful Runabout

Lines of a 28-Foot Displacement Speedster Which Captured the Record Trophy on Her Debut in the Racing World—High Lifting Powers and Dryness, Features of Her Design

DIPPIE DA was designed to meet the requirements of an owner who wished a comfortable runabout with some speed to her. A glance at her record will show that his desires were fulfilled.

Dippie Da was designed by D. A. Toal, of Camden, N. J., and built by L. D. Steel, of Delanco, N. J., for E. B. Jackson, of the Chelsea Yacht Club. She made her debut in the racing world at River-ton on September 25, 1915, when she

captured the Philadelphia Record Trophy for speed boats by beating Xqme and Nancy II. She is the only boat that has ever taken the Record Trophy away from home waters. She has been in three races of which she has won two, and her gasoline line broke in the other race.

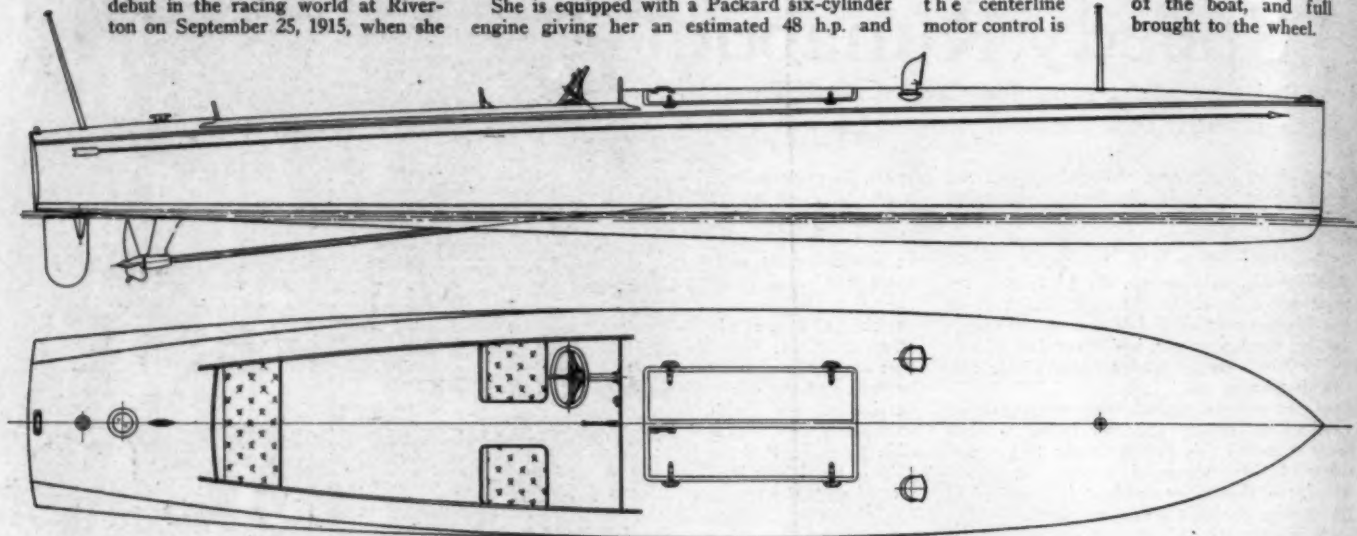
Her principal dimensions are: length, 28 feet; beam, 5 feet, and draft, 8 inches.

She is equipped with a Packard six-cylinder engine giving her an estimated 48 h.p. and

a sustained speed of 26 real miles per hour.

The outstanding features of her design are her high lifting powers due to the shape of her forward sections and her perfect dryness under all conditions.

Dippie Da is arranged with her motor forward under hinged hatches and with a roomy cockpit having seats for four and space for chairs. The reverse gear lever is placed on the centerline of the boat, and full motor control is brought to the wheel.



Dippie Da was designed by D. A. Toal, and built by L. D. Steel for E. B. Jackson, of the Chelsea Yacht Club. She is powered with a six-cylinder motor, and has a speed of 26 miles

A 40-Footer with Twin Motors

High-Speed Day Cruiser Designed by the Eastern Shipyard Co. for Service on Long Island Sound—Two Eight-Cylinder Engines Installed Amidships with Controls Brought to Steering Wheel

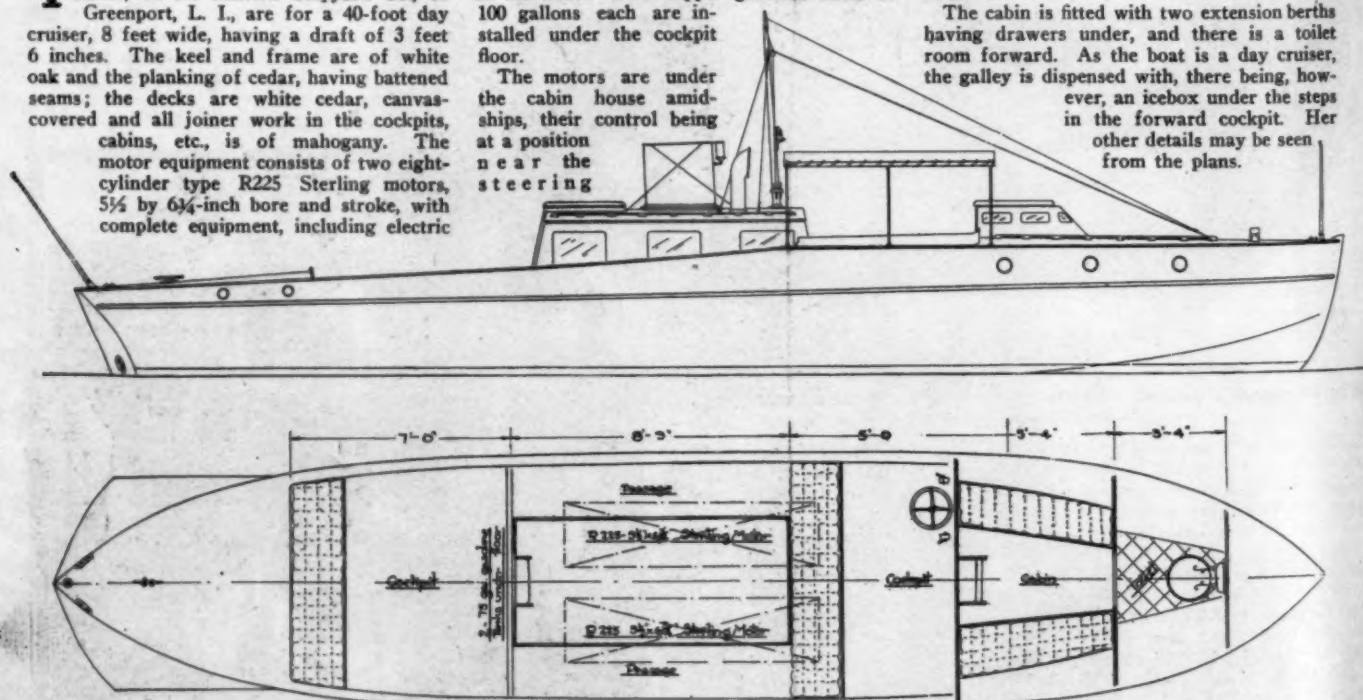
THE accompanying drawings by William Atkin, of the Eastern Shipyard Co., of Greenport, L. I., are for a 40-foot day cruiser, 8 feet wide, having a draft of 3 feet 6 inches. The keel and frame are of white oak and the planking of cedar, having battened seams; the decks are white cedar, canvas-covered and all joiner work in the cockpits, cabins, etc., is of mahogany. The motor equipment consists of two eight-cylinder type R225 Sterling motors, 5½ by 6¾-inch bore and stroke, with complete equipment, including electric

starter. The exhaust is muffled, passing out at the stern. Two copper gasoline tanks of 100 gallons each are installed under the cockpit floor.

The motors are under the cabin house amidships, their control being at a position near the steering

wheel. The estimated speed is 35 miles an hour.

The cabin is fitted with two extension berths having drawers under, and there is a toilet room forward. As the boat is a day cruiser, the galley is dispensed with, there being, however, an icebox under the steps in the forward cockpit. Her other details may be seen from the plans.



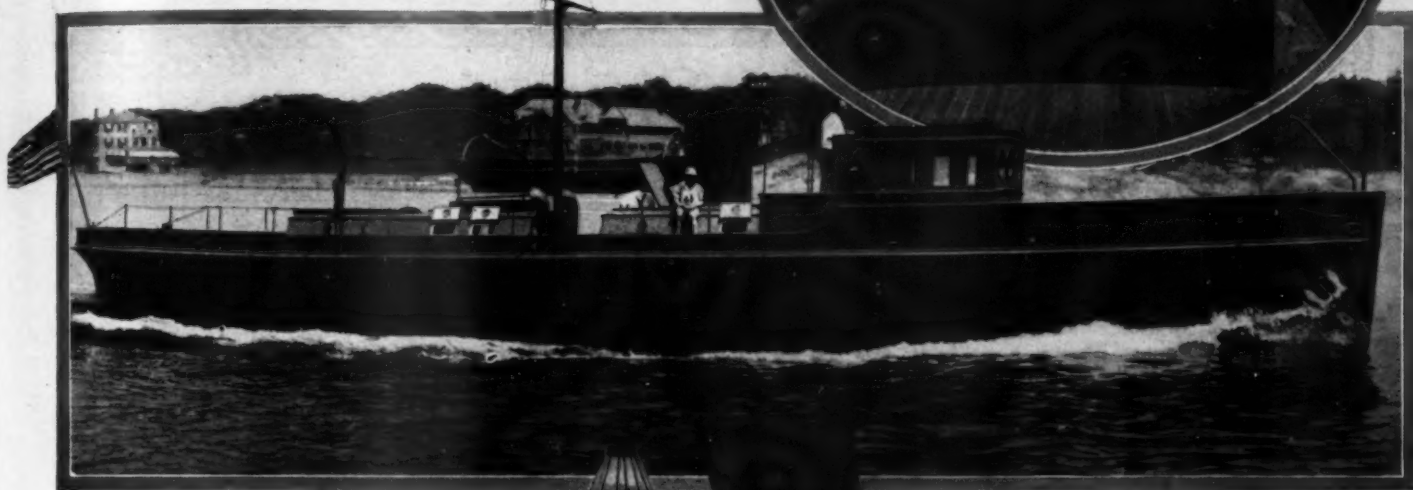
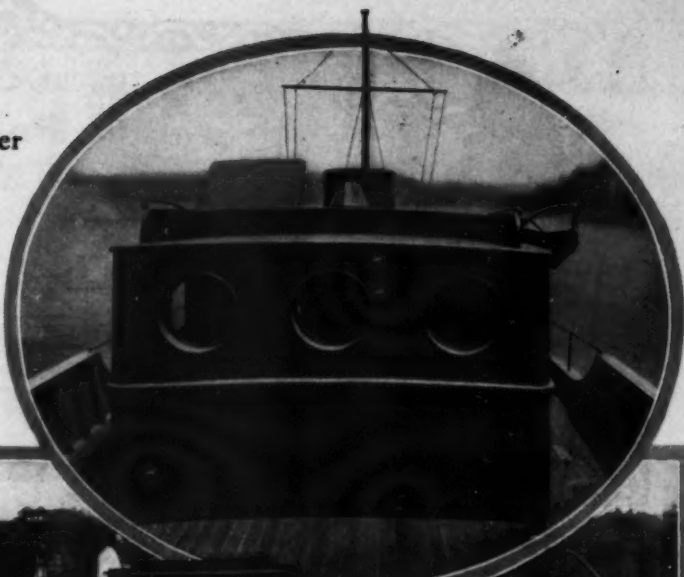
This 40-footer is laid out with cabin and toilet forward and with cockpits forward and aft of the engine-room trunk. An ice-box is installed under the forward cockpit steps

Gurkha

A 61-Foot Cruiser of the Torpedo Boat Destroyer Type—Marked by Sound Construction and Seaworthiness

ONE of the new boats which was very favorably received last summer is Gurkha, shown in the accompanying photographs.

This boat was designed by Swasey, Raymond & Page, Inc., of Boston, for W. H. Stuart, of Swampscott, Mass., and was built by Britt Bros., of West Lynn. She resembles a small torpedo boat destroyer in her outboard profile and her underbody is a modification of the U. S. Government destroyer hull; she is a development of Mr. Raymond's Ensign, a 68-footer which was described



in the July, 1914, issue of MoToR Boating. Gurkha's dimensions are 61 feet overall, 59 feet 5 inches on the water-line by 13 feet beam and 4 feet 6 inches draft. She is almost entirely a flush-deck cruiser, although small, low and narrow trunks have been built over the cabin and engine-room to give ample headroom in these compartments. From the pilot-house bulwarks are carried forward to the bow, heightening the free-board and giving an attractive sheer.

The accommodations of this boat are as follows: A very large storeroom occupies the extreme bow, and aft of this comes the owner's stateroom with two berths, a chest of drawers and numerous clothes lockers. Following this is a chart room or pilot-house with a navigation bridge immediately aft. Below the chart room are lockers, trunks, etc., and aft of this space there is a large engine-room which has been very carefully laid out. Coming next on the starboard side there is an attractive little galley with the toilet opposite. A large cabin with four built-in berths occupies the remaining space, except for the lazarette.

The power plant consists of a six-cylinder 6½ x 9-inch 75 h.p. Sterling engine which drives the boat at a cruising speed in excess of ten knots.

The hull construction is very heavy, as the owner desired a boat which could go to sea in any sort of weather that would be encountered during the yachting season, and would bring him home safely any time he wished to come. The boat is painted battleship gray throughout, without any brass work, enabling her to be kept up very easily by one man. The small boat equipment consists of a dinghy and a motor tender slung from



The navigating bridge and the chart room

Powered with a 75 h.p. Sterling, Gurkha maintains a cruising speed of over 10 knots

davits abreast of the cabin trunk, where they are readily accessible.

GURKHA

Length.....	61 feet
Beam.....	13 feet
Draft.....	4½ feet
Motor.....	Sterling
Power.....	Seventy-five
Speed.....	10 knots
Designers....	Swasey, Raymond & Page
Builders.....	Britt Bros.
Owner.....	W. H. Stuart



Sleeping accommodations for four are provided in the main saloon aft

Photographs by Stebbins

PRIZE CONTEST

IN QUESTIONS & ANSWERS

The Fuel Situation

What Must Be Done to Meet the Rising Cost of Gasoline—Remedy Thought to Lie in More Efficient Marine Engine Design and Operation Than in Kerosene or Other Substitutes

THE PRIZE CONTEST—Answers to the First Question in the March Issue

The Remedy Lies Within Yourself

(The Prize-Winning Answer)

ALTHOUGH much energy has been directed towards adapting substitutes, present indications point to the continued use of gasoline fuel. This will be economically possible through future improvements in manufacture, resulting in an increased yield from crude oil, thus preventing the price from climbing prohibitively high. In the meantime, the price is high, and will probably increase before falling. So the question before us is, "What shall we do about it now—seek a substitute or use gasoline more economically?" My answer is, "Do both."

A successful substitute must satisfy two requirements. First, it must be obtainable anywhere—there is no gain in being able to burn a cheap fuel if that fuel is not available. Second, the substitute must be readily adaptable to the engine at hand without disfiguring it and committing changes, repulsive to the owner of a high-grade gasoline power plant. It is a substitute fuel we are seeking—not a substitute engine.

The much talked of benzol and alcohol are disqualified by the first requirement; benzol, absolutely, because it is a limited by-product; alcohol, probably, because there is no organization interested in its manufacture and distribution. The remaining possibility is kerosene.

Unquestionably, kerosene can be efficiently used by the standard four-cycle engine and carburetor under certain limitations. These are: it will not readily start the engine, it and the air must be preheated for complete vaporization, and it will not accommodate itself readily to changes of speed and load. Furthermore, it is highly desirable to add to the fuel mixture a small percentage of water or steam to prevent pre-ignition, carbonization, and "cracking" of the fuel. It is expedient, therefore, to use both gasoline and kerosene, the former for starting and for low or variable speeds, the latter when under way at normal speed, which is the usual condition.

Questions for the July Issue

1. Discuss the handling of a small motor dory in a seaway, the advisability or danger of running in a quartering sea or trough and the possibility of using a sail in time of need. Suggested by J. K. B., N. Y. City.

2. Describe and illustrate a simple and satisfactory method of launching a motor boat from a wharf or bulkhead where no beach, marina railway or derrick is available. Suggested by W. E. M., Philadelphia, Pa.

3. Describe with sketches, a layout for an engine compartment situated beneath the bridge deck of a small double cabin cruiser, that will conform to the following requirements:

a. Deck watertight. b. Accessible. c. Well ventilated. d. As much natural light as possible.

RULES FOR THE CONTEST

Suggested by F. T. L., N. Y. City.

Answers to these questions, addressed to the Editor of MoToR Boating, 119 West 40th St., New York, must be (a) in our hands on or before May 20. (b) about 500 words long. (c) written on one side of the paper only, (d) accompanied by the senders' names and addresses. (The name will be withheld and initials or a pseudonym used if this is desired.) Questions for the next contest should reach us on or before the 20th of May.

The prizes are: For each of the best answers to the questions above, any article advertised in the current issue of MoToR Boating, of which the advertised price does not exceed \$25, or a credit of \$25 on any article advertised in the current issue of MoToR Boating which sells for more than that amount. (There are three prizes—one for each question—and a contestant need send in an answer to but one if he does not care to answer all three.)

For each of the questions selected for use in the next contest, any article advertised in this issue of MoToR Boating, of which the advertised price does not exceed \$5, or a credit of \$5 on any article advertised in this issue of MoToR Boating which sells for more than that amount.

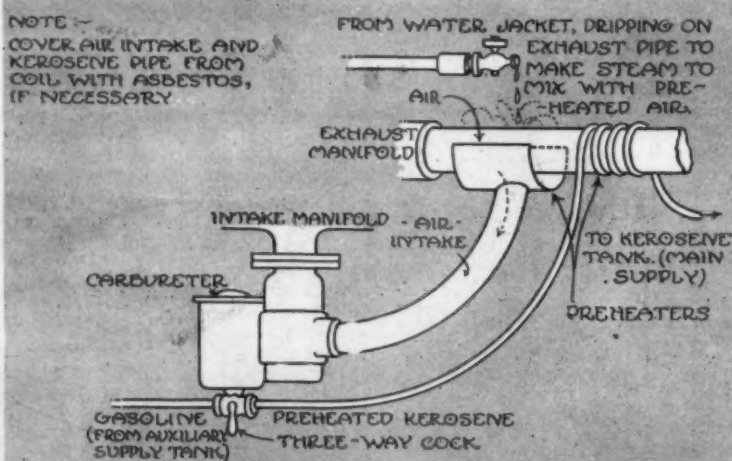
The accompanying figure illustrates how this may be done. After the engine has been started and heated on gasoline, the three-way cock is thrown so as to admit preheated kerosene. The steam supply is introduced with the preheated air, as shown. The change back to gasoline should be made before the end of a run, so as to fill the carburetor for the next starting. This arrangement has been tried out, and will give satisfaction so long as a mixture temperature of about 200° is maintained and condensation in the intake manifold is avoided.

To get the best out of an engine using gasoline, one should have means of securing definite data upon its performance. A revolution counter, accurately calibrated fuel tanks, a time-piece, and a pressure gauge for measuring compression will often tell when it is necessary to look to such items as valve timing, piston rings, and carburetor adjustment.

The last named affords the greatest opportunity for economy. As a rule, carburetors are adjusted to give the most powerful mixture (necessarily rich), but the fact is that a gasoline engine will not yield its best economy at maximum load. If one is content to run at between ten and twenty per cent. underload, a large saving in fuel consumption per horsepower per hour may be made if the carburetor is properly adjusted. The underlying principle is that the leaner the mixture, the more economical is it, up to the limit of combustion of the gas. To apply this, open the throttle wide when under way, increase the air, or decrease the gas, until a slowing down of the engine of between

ten and twenty per cent. results, or until back-firing occurs. The spark should then be advanced to compensate for the attendant slower combustion. The mixture may now be so thin that a second adjustment will be necessary for low speeds or starting, and you will no longer be able to "start on compression." These are disadvantages, but something cannot accrue from nothing, and to get ahead of the gasoline game, one must expend some effort. Think of the many conveniences of the modern marine motor and be content.

JULIAN C. SMALLWOOD,
Syracuse, N. Y.



Ingenious arrangement devised by Mr. Smallwood for heating kerosene and for admitting steam to the engine cylinders

When you send in your answers you must state what you will take for a prize should you win one

Distillate Points the Way

ALTHOUGH not widely obtainable in the East, distillate is the fuel in general use on the Pacific Coast for all heavy-duty engines, and for many of the higher speed pleasure type. It is a liquid somewhat resembling kerosene, but which evaporates somewhat more quickly, and it costs locally from six to eight cents per gallon, while kerosene averages twenty-five cents.

No changes are required in a heavy-duty engine to fit it for this fuel, beyond providing a warmed air intake to the carbureter, preferably by carrying a tube or pipe from a collar around the exhaust pipe or other hot part to the carbureter intake. This is not absolutely necessary and sometimes in warm weather it is best to cut out the heated intake. To start the engine it is only necessary to prime the engine cylinder (local engines are all provided with a special priming opening in the intake pipe) with gasoline carried in an oil can. After the engine has run enough to get warmed up it will generally re-start without priming on turning the flywheel over by hand. It is not necessary, or, in fact, possible, to spin the flywheel, the engines being too heavy. The wheel is turned slowly by hand or by a bar inserted in slots in its rim.

The carbureter adjustment for all ordinary purposes is the same as with gasoline. Lighter engines of higher speed than the heavy-duty and two-cycles are frequently run on distillate with good results, although there is liable to be some misfiring when the engine is throttled down. Most of this, however, can be overcome by experimenting with the carbureter adjustment.

It is likely that there will be more trouble with carbon deposits in the cylinders, as is usual with all lower grade fuels. But carbon deposits are often caused by a poor grade of cylinder oil, or too much oil, the fuel being unjustly blamed for it.

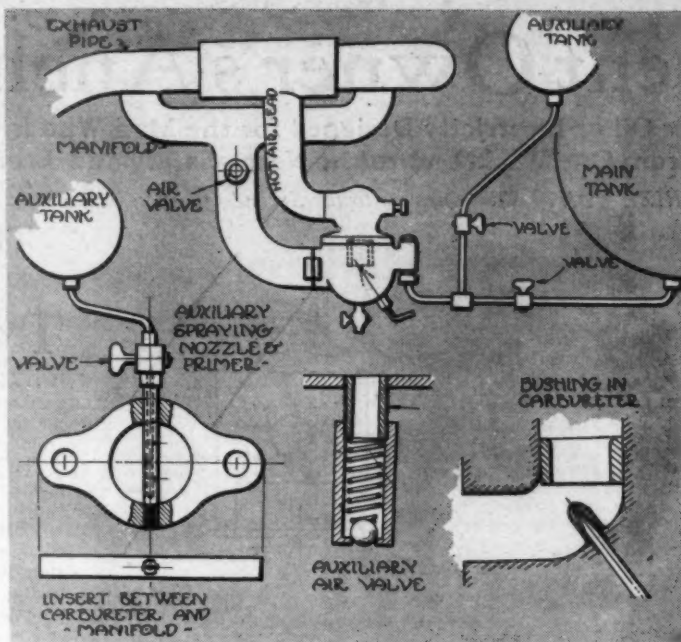
H. H. PARKER, Oakland, Cal.

Substituting With Kerosene

THE sharp advance in the price of gasoline would demand that the motor boat owner's attention be turned to substitutes. Apparently, there is only one oil product or other fluid available in sufficient quantities at a cost considerably below that of gasoline, and kerosene, at one-third the price of gasoline, would, provided the obstacles to its employment were removed, be the most desirable substitute.

Kerosene and gasoline of equal proportions will produce more effective work for the same quantity of fuel, and undiluted kerosene will produce a still greater amount of work, due, of course, to the higher percentage of heat units that the heavier fuel contains.

The drawbacks incidental to the use of kerosene as fuel in gasoline engines are the difficulties of starting and of carburetion. The difficulty of starting may be eliminated by the installation either of an auxiliary spraying nozzle into the manifold or a container for a small supply of gasoline on the same oil line



Various suggestions advanced by G. A. L. for adapting the motor to kerosene as a fuel

near the carbureter. The engine should be operated on the gasoline only sufficiently long to heat it to its working temperature when it may be switched over to the kerosene.

Some experimenting with the carbureter is necessary (as the same procedure would not apply to the different makes) to determine its ability to vaporize the heavier grade of oil. It would be necessary in the majority of cases to introduce a bushing or other obstacle into the orifice about the spraying nozzle of the carbureter for decreasing the area, thereby increasing the velocity of the air past the nozzle, as the vaporization is largely dependent upon the speed of the air past the spraying nozzle. The installation of an automatic auxiliary air valve in the manifold may be necessary for the admission of air to take care of higher engine speeds. Of course, it would be advisable, in fact very necessary, to employ a hot air lead from the exhaust pipe, as the heated carbureter is still more capable of taking care of a heavier fuel. The illustrations give constructions for the aforementioned suggestions.

With the most effective and economical use of gasoline the exhaust should, if noticeable at all, bear every resemblance to that of a steam engine. Lubricating oil gives off a snowy smoke, while indifferent carburetion adds color to the exhaust, showing a dark brown or black tinge. The condition of the porcelain of the spark plug gives mute evidence of carbureter work, a light brown coating of the porcelain being the deposit of consumed lubricant, while very dark or black, sooty deposits are indication of too great a proportion of gasoline to air.

Another way of determining the correctness of the mixture is by opening one of the cylinder petcocks and observing the color of the flame which jets out at each explosion. A light yellow jet indicates a lean mixture, a red jet a rich mixture, and a blue, barely distinguishable flame the correct carbureter adjustment.

The installation of a new carbureter in the event that the one in use is not capable of handling the heavier grade of gasoline, now procurable, is advisable. But under any and all circumstances the mechanical and electrical condition of the engine must be good, with clean combustion chamber, valves ground in and properly adjusted, and the ignition spark of proper intensity.

G. A. L., Washington, D. C.

Satisfaction Obtained from Kerosene Vaporizer

THE question of a substitute for gasoline, or of getting more power from gasoline, is, at the present prices, a serious one. In the last few years great steps have been made in the direction of more economical engines and no doubt in the future there will be still more done to give us engines of more power on less gasoline.

The carbureter is responsible for a great waste on many engines, as was shown by tests made on a 12 h.p. four-cylinder engine, using several makes of carbureters. This engine was run on identical load in each case, the best make of carbureter showing a saving of from 5 to .6 pounds of gasoline per horsepower hour over the poorest. This saving in a season would more than pay one to put on the best carbureter money can buy.

In considering any substitute for gasoline the cost and the availability must come in for careful thought. Engines can be run on several motor fuels, such as methyl-alcohol, distillate, motor spirits, benzol and kerosene. Most of these are hard to get, and some, as in the case of alcohol and benzol, are more expensive than gasoline even at its present figure.

Kerosene used for fuel is probably the best solution, as it can be obtained in almost any place that gasoline can, and is considerably cheaper. There are several carbureters for kerosene use on the market and some of them are giving good results. They all work on the principle of heating the air before it enters the cylinders, but most of them make the mistake of heating the intake air to the carbureter, wherein, by the time the fuel is vaporized and passed through the manifold it is cold, as it takes up heat when vaporizing.

The most successful kerosene burning engine I have seen is a four-cylinder four-cycle, 23 h.p. heavy-duty type, having the intake and exhaust manifold in one casting with a partition separating the exhaust gases from the incoming gas. This arrangement preheats the intake gas to the engine and gives very good results. There is attached a 3/8-inch copper tube running from a small water tank to the intake manifold. In case the engine runs hot a small quantity of water is allowed to run into the cylinders, which cools them and prevents carbon from forming. This engine, however, has been run for several days without using any water whatsoever. It is, of course, necessary to start the motor by means of gasoline and run until the engine is heated up, and then switch to the kerosene.

Engines using kerosene run best on full loads and when idling are liable to miss occasionally, but in boating very little time is spent on light loads, and, even so, it is an easy matter to switch from kerosene to gasoline, by means of valves in the two pipes. The engine referred to is fed from two tanks, one containing kerosene and the other gasoline. Two feed lines, one from each tank, come together in a three-way cock and run from there to the carbureter. By means of this valve either gasoline or kerosene may be run to the engine. Upon a mixture of half kerosene and half gasoline the engine will start without switching to pure gasoline.

H. S. HEWITT,
Rock Island, Ill.

The Absent Owner's Anchor Light

Outfits Burning Either Oil or Electricity Designed for the Man Who is Obligated to Leave His Boat Untended from One Week-End to the Next—Safety and Economy Demanded

THE PRIZE CONTEST—Answers to the Second Question in the March Issue

Two Satisfactory Lamps

(The Prize-Winning Answer)

TO the boat owner who lives at a distance from his boat and who by force of circumstances must moor his craft in a roadstead or waters that are much frequented, the problem of an anchor light is an annoying one. If the club house janitor or some one else can be hired to look after a light, the question is solved, but this is not always a ready solution to the problem. Either of the two "eight-day" lights herein described will be of service to such a boat owner.

Procure at a chemist's shop a glass beaker, cylindrical in form, $3\frac{3}{4}$ inches in diameter and 6 inches high. A preserving jar with the top cut off would be a substitute if the first is not obtainable. A No. 2 Guillon wick (about $1/16$ inch in diameter) or one of several American makes is fastened to the wire stand, as shown in Fig. 2. If one of these so-called eight-day wicks is used, the vertical parts of the stand should be about one inch.

These wicks are sold by the box, sixty to a box, but in case they are not used, a wick may be built up out of fibers from an ordinary wick, lapped with thread around the wire support, made as in Fig. 2, but with the vertical part brought to a height of $5\frac{1}{2}$ inches. This stand should be made of No. 24 tinned spool wire.

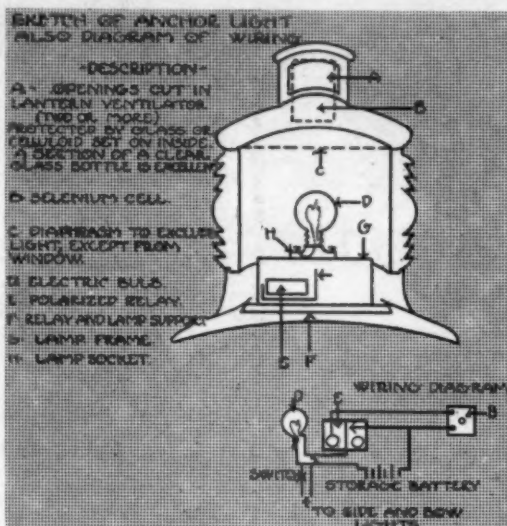
Clean the beaker thoroughly with a lintless cloth, bearing in mind that such a receptacle should never be washed with water. Insert the wick and its support, as shown in Fig. 3, and fill the beaker to three-quarters full with olive oil or lard oil, making sure that the wick is in the middle of the beaker. Sometimes the flame seems, after lighting, to be at the point of expiring, but it will slowly attain its height of about $\frac{3}{8}$ inch.

The lantern case is a large (schooner) size, in which the oil retainer has been cut off at the dotted line in Fig. 1. If the beaker does not fit closely fill the intervening space with plaster of Paris.

The electric attachment shown is for the boat owner who has a storage battery, 6-volt 90 ampere-hour preferred. As this is usually connected to a generator, week-end runs will charge it for loss during the week.

An eight-day alarm clock movement is attached to a stand, as shown in the plans. A two-inch wheel is fastened to the hour hand with double-pointed tacks. Double-pointed tacks are also used to fasten the legs and the top of the clock to the stand. A four-inch wheel is fastened to the stand above the two-inch wheel and a No. 18 rubber band is used as a belt, grooves for same being made in the wheels.

On the back of the four-inch wheel fasten the contact segment five feet four inches long and three-eighths inches wide, set in

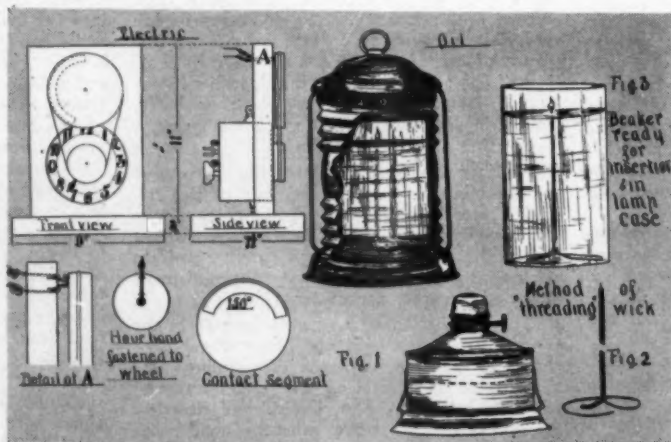


Electric riding light suggested by Mr. Westcott, which depends on a selenium cell for its operation

one-eighth inch from the edge. The tip of the hour hand in passing from 7 P. M. to 5 A. M. covers an arc of 300° , consequently the four-inch wheel will pass through an arc of 150° in the same do so but day. A 2 the anchor sufficient.

To set, segment be making with the closer at A 7 or a little circuit No. 24 wire lightly contact This latter copper. For other settings, remember that each clock hour means a distance of 15° on the upper wheel.

JAMES E. MURPHY, New London, Conn.



Details of the lard oil lamp and the automatic electric light, both for eight-day operation, suggested by Mr. Murphy

The Selenium-Cell Principle

THE lamp described below depends for its operation on a selenium cell, which has the property of changing its resistance to the passage of electric currents when it is exposed to light or the light is excluded. This light may be from any source.

This change of resistance causes the polarized relay E to open or close the circuit to the lamp D. Selenium becomes an insulator and bars the passage of electricity when it is in the dark, but immediately becomes a good conductor of electricity when the light strikes it. Thus the relay can be adjusted so that the lamp will be lit on very foggy days. This adjustment will also cause the lamp to be extinguished on very bright moonlit nights.

The period that the lamp will need no attention depends on the source of supply. By using a tungsten lamp of 2 c.p. and a 6-volt 60-ampere hour storage battery it will operate about eight or nine days without any attention. This is figured on a seven-hour night of lamp light. Of course the efficiency of the storage battery has a great deal to do with this period of operation.

If it is desired, the side and masthead lights may be operated from this same relay by connecting the circuit as shown in the sketch. These can be cut in at their individual switch during the day, or at the start in the morning, and you can rest assured that when it gets dark all your running lights will be lit.

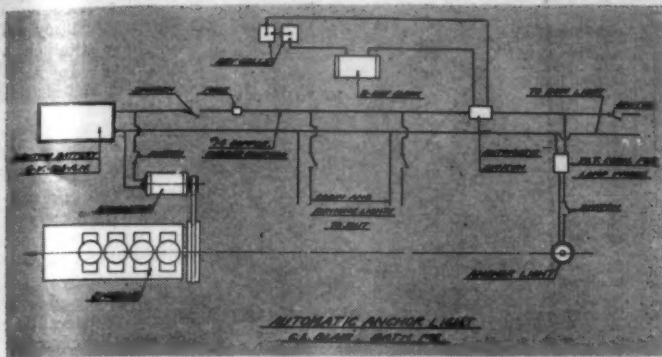
If it is desired the selenium cell B may be mounted in a skylight or anywhere that the change of daylight can affect it. This is optional. P. K. WESTCOTT, Brooklyn, N. Y.

A Safe Oil Lamp

THE Federal Regulations governing steam-boats, including all motor boats, require that any boat anchored or moored on or near any channel or fairway navigated by other vessels shall carry a white anchor light from sundown to sunrise. Many of us may not be acquainted with the fact that, should another boat run into your boat, anchored

without a light, you would have no claim for damages, but would be liable for any damage to the other boat. Even if it were otherwise, safety requires that you carry an anchor light at all times when anchored, and carry it burning and in place. The majority of the smaller boats disregard this rule and get away with it without trouble. The inability of many to visit their boat every day and the attendant trouble may be overcome by a lantern that will burn a whole week without trouble. Such a light can be constructed from a regulation anchor light without much trouble or expense.

Select a pattern that is known not to blow out. Remove the oil fount and construct a new and larger one, or solder a projection



Wiring diagram for an automatic anchor light devised by C. L. Blair, for operation by clockwork. Its only fault lies in the fact that the automatic switch is closed and opened by the hour hand at twelve-hour intervals, thereby taking no advantage of possible economy of current consumption on short nights. As devised, the running lights may be cut into the system

to the side of the regular fount. Fill it with oil and find how long it will burn with one filling. From this figure the amount of oil required for seven days and make an auxiliary oil reservoir, same diameter as the lamp and of sufficient height to contain that amount of oil. To the bottom of the reservoir solder a ventilated metal rim to fit the conical top of the light and provide a filling plug having a very small vent.

Cut a hole in the top of the oil fount and solder in a screw plug at least one inch in diameter. If the old fount is used the projection is for this plug and float valve. To the cap solder a float valve constructed as follows (or you may be able to use one from an

and soldered on the inside. Make a small brass piece to nearly fit the flanged tubing and grind in a tight fit with valve grinding compound. Through the center of the valve run a straight piece of wire and attach a light metal float to the lower end, in such

(Continued on page 60)

A Leaf from the Railroad Man's Notebook

MOST all railroads use what is known as "seven-day burners and founts" in switch and semaphore lights. As is well known, these lamps require dependable



Kerosene riding light with fount such as is used in railroad semaphores and switch lights, rigged up for his own use by Mr. Fauquier



lights that will burn brightly for seven days, if necessary, and it was this feature that induced me to secure one of the burners, chimneys and fount and construct an anchor light for my boat. I have used the light for over two years and it has never failed to burn for the entire week, from Sunday until the following Sunday, consuming about one pint of kerosene oil a week.

The fount, burner, wick and chimney cost, wholesale, about sixty-five cents, and can be secured from railway supply houses. Most any ingenious boatman can apply one of the founts to a common lantern, or have a tinner do it for him. It is only necessary to cut away the fount and bottom part of the lantern and solder the seven-day fount in place.

The lamp will burn better if a "down draft" is arranged for and will burn without a flicker during a gale of wind.

The picture shows the light complete and the burner, wick and fount separately; the wick is of felt and will last for years.

Of course, it is necessary to have a regular globe in the lantern, the one attached to the seven-day fount going inside the lantern globe.

C. C. FAUQUIER, Chicago, Ill.

Permanent Moorings and Buoys

How the Boat Owner May Put Together the Necessary Essentials for a Safe and Convenient Mooring at His Home Anchorage—Concrete Most Favored for Ground Tackle and Cedar for Buoys

THE PRIZE CONTEST—Answers to the Third Question in the March Issue

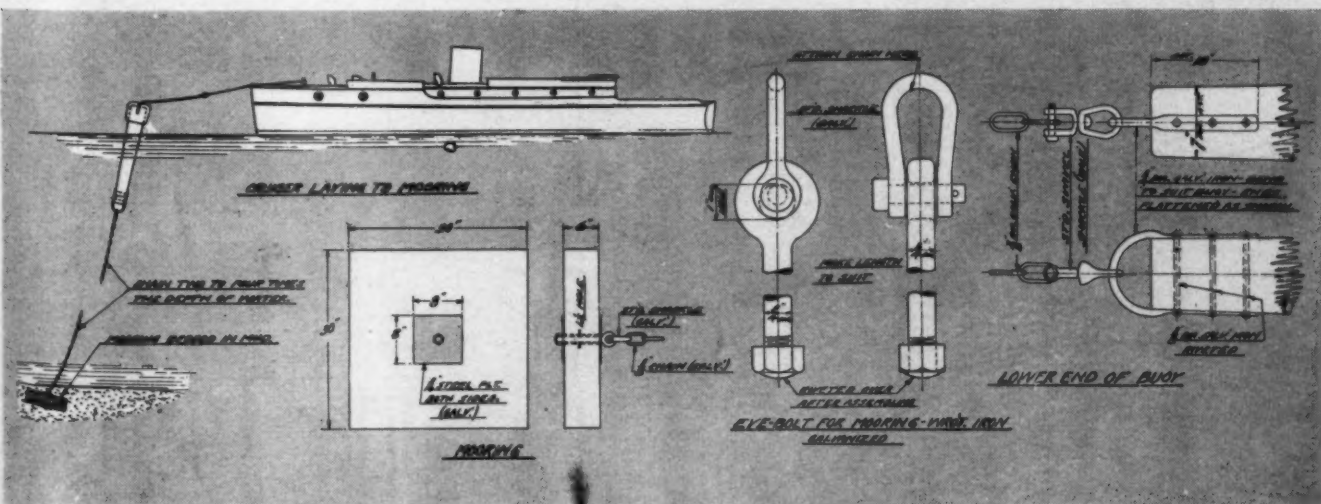
Consideration of Several Methods

(The Prize-Winning Answer)

THERE are many types of moorings in use, but of them all, the keg is probably the cheapest and undoubtedly the strongest. An ordinary beer keg in good physical

condition can be obtained anywhere. As this must float it must be kept perfectly watertight, so a plug is made and driven into the bung hole. It is then necessary to extend a 3/4-inch rod through the two headed ends of the keg for transmitting the strain of the tugging boat through the keg to the mooring chain and then to the mooring block.

In constructing the iron rod cut it long enough to allow for a welded eye and about three inches of the upper threaded end over the distance between the outside of the head and the bottom of the keg. The rod is threaded at the lower eye and the jam nut screwed on before welding. The washers, etc., can be slipped on afterward. Felt or rubber washers



Mr. Blair would have you use a flat stone or concrete for the mooring, and a good sound log of wood, padded at the upper end, for the buoy, allowing a scope equal to from two to four times the depth of the water

under the metal ones, tightened down by the jam nuts, will keep the keg from leaking at the ends. All chain should be at least $\frac{1}{4}$ -inch link diameter—the split link should be sufficiently large to insure free motion.

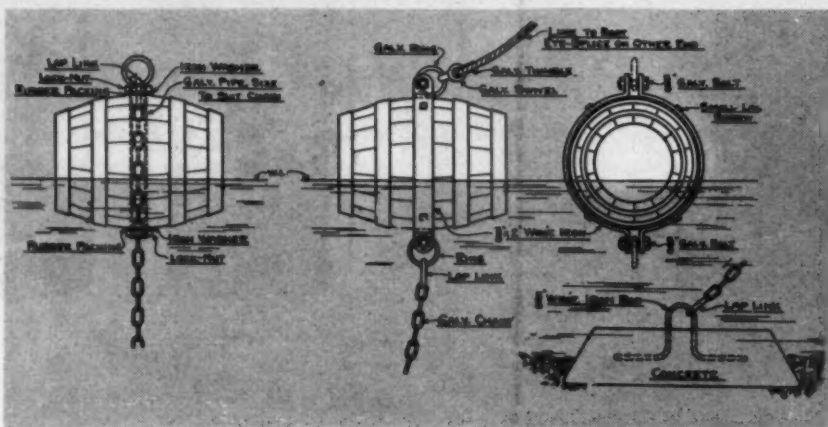
The swivels illustrated are forged and later drilled with one-inch diameter holes to take the rod. They may even be made by cutting a one-inch band from a three-inch air pipe and flattening. The chain should be of sufficient length to insure a good lead, being governed by the depth of water.

The mooring proper may be constructed of concrete, going about the process as follows: First construct a box 2 by 2 feet by about 15 inches deep, and in the center of the bottom bore a hole that will take the head of a $\frac{3}{4}$ -inch bolt. Procure such a bolt about 18 inches long, having at least 2 inches of thread, and provide it with a swivel, which may be made as before illustrated. A piece of plate will form a washer to keep the bolt from pulling through the concrete block. Burr the head of the bolt over well when the parts have been assembled. Mix concrete consisting of one part of cement, two parts of sand, and four parts of cracked stone, doing this very thoroughly and adding water to suit. Set up bolt, washer and swivel in the form, as illustrated, and transfer the mixture to it.

This type of mooring is permanent. When winter comes the keg is removed and a wire attached to the chain and dropped, stretched between two given points. It is an easy matter to grapple for this in the spring and the repainted buoy is again ready for use.

There are many types of moorings and floats used, of which most are herewith illustrated. Use good judgment and pick that which best suits your ideas and pocketbook.

WARREN B. SNOW, Philadelphia, Pa.



Mr. Motz's two suggestions for the use of a keg as a buoy are good, but would be better if the keg were arranged to float upright in the water

Flat Stone or Concrete

THERE are several types of moorings and buoys and it is not possible to choose any one type and call it the best. However, the one shown in the accompanying sketch has given excellent satisfaction in a soft bottom.

For the mooring get a flat stone, as shown, about thirty inches square and six inches deep, which will weigh around 400 pounds. Bear in mind that it is the suction of a mooring that holds more than its weight, after it has settled in a soft bottom, so be sure to get a large flat stone.

If desired, the mooring can be made of cement filled with old chain, etc., to give it weight, and the eye bolt set securely into it. If a stone is used, drill a hole about $1\frac{1}{4}$ inches in diameter through its center, and make and fit the eyebolt, as shown in the sketch.

Now get a standard $\frac{3}{8}$ -inch galvanized shackle, and shackle one end of your chain to this eyebolt. Chain about $\frac{3}{8}$ -inch diameter will be right for a 40- or 50-footer. The chain should be about twice as long as the water is deep, and if you have plenty of room to swing or are on poor holding ground three or four times the depth will prove better. If

this will require more chain than the buoy will float, have the chain long enough to reach the surface and shackle one end of a rope into which a thimble has been spliced to your chain, the other end being made fast in a similar manner to your buoy, no swivel being required in this case.

For the buoy get a good sound log of wood nine or ten feet long and seven inches in diameter at the small end. This will float up to seventy feet of $\frac{3}{8}$ -inch chain and still have a good freeboard. Cedar makes an excel-

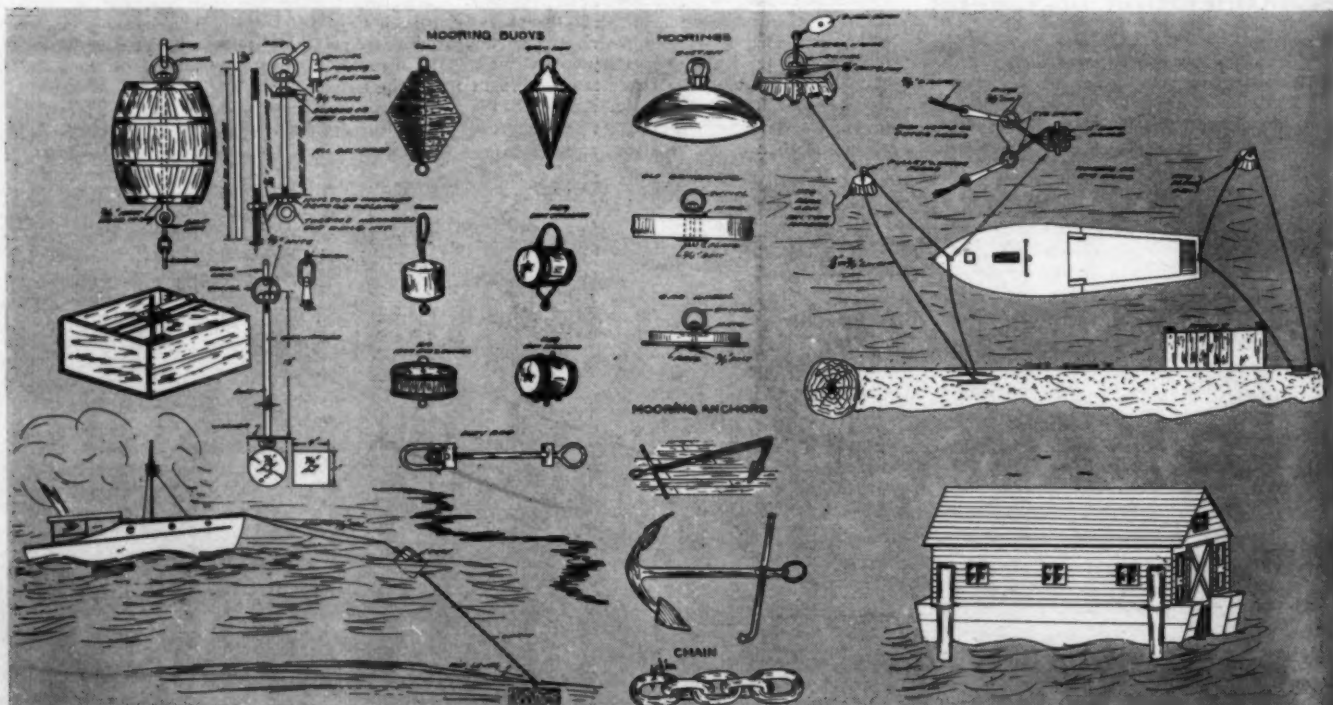
lent buoy, but any other light wood will do. On the small end fit the U-shaped band and swivel shackle, as shown, using $\frac{3}{8}$ -inch rod riveted over at both ends, or bolts, if desired.

At the large end, about six or eight inches from the end, drill a hole a little larger than the mooring rope you intend using (a $1\frac{1}{4}$ -inch hole and $1\frac{1}{4}$ -inch diameter rope is about right), and after pounding the upper edges and cutting a groove for the rope, from the hole to the end of the buoy, pass an end through and splice it. After deciding how long you want your mooring line (say eight or ten feet) splice an eye or thimble in the end.

Now cover eighteen inches of this end with canvas, after padding it well, so it will not scrape the paint off your boat, give the buoy a couple of coats of white lead paint and you will have a serviceable mooring that you can depend on to hold your boat at all times.

If it is not desired to bring the heavy, wet mooring line on board, a doubled rope bridle can be made fast to the bitts or cleat and an end passed through each chock and mooring hooks hooked into the thimble spliced in the end of the mooring line.

C. L. BLAIR, Bath, Me.



Mr. Snow, the prize winner, suggests here a great variety of ways whereby a permanent mooring may be devised for a medium-sized cruiser

For All Types of Bottom

PROBABLY nothing connected with a boat figures so greatly in its safety while at anchor as its mooring. A good substantial one is the best remedy for boatmen who do not enjoy complete ease of mind during some of our summer squalls.

In the accompanying illustrations no attempt was made to set any definite dimensions which must be adhered to, since the conditions where the mooring is to be located play an important part in deciding upon the size of buoy, chain and method of anchoring. Three things must be considered, namely, the size of boat, the condition of bottom and whether the mooring will be in protected or open water. Where strong currents are encountered, a larger buoy will be required than in quiet water, to resist the tendency of the current to drag it under.

Again, the size of the concrete blocks, as shown in the sketch, will vary with the nature of the bottom. This block for a cruiser about 30 feet long to be anchored in soft mud should be about two feet square by six inches thick, which would weigh between 175 and 200 pounds. A wide flat block will sink in the mud perhaps a foot or two and take a good hold, due to the suction formed beneath. For a hard bottom I would recommend increasing the weight and making the sides tapered, as shown. This block will cut into the mud edge-wise, if it should start to drag. For a rock bottom, the holding power is almost entirely dependent upon the size of the block, so that, again, considerably more weight will be required.

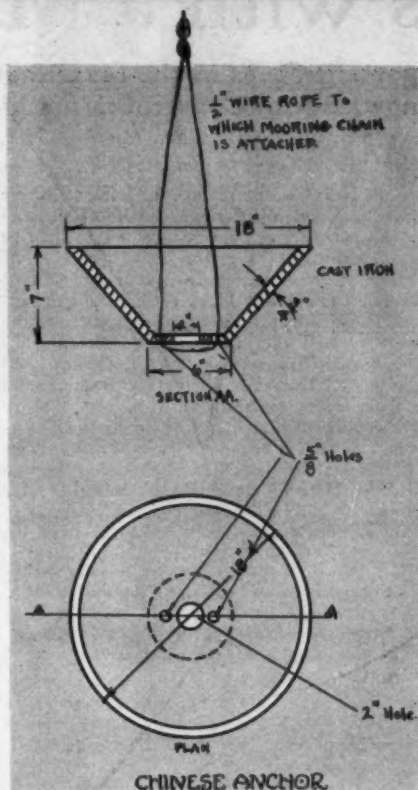
In making the concrete use one part Portland cement, two parts sand and three parts broken stone, and pour into a wooden mould, of the proper shape, which need not be removed. While pouring, tamp compactly and place an eye in the middle, as shown in the sketch. Allow the block to harden about two weeks before using.

For the buoy, a strong, tight keg should be used. One method shows heavy iron straps around the keg, which will have to be forged, and are clamped tightly by means of the bolts.

After so doing insert small lag screws through the straps, into the keg to prevent them from coming off accidentally. The other method can be done with few tools. Bore a hole through the center of the keg large enough to let a piece of pipe, threaded at both ends, pass entirely through it. Plane the sides slightly flat where the pipe will come through the keg, and after inserting the pipe, secure it at both ends with locknuts, having first placed rubber packing and then an iron washer between the nut and the keg. The chain is led through the pipe, a large ring being afterward fastened to the end by means of a lap link. This method puts no strain whatever upon the keg. Paint the keg, using two bright colors, in order that it may be readily distinguished from others.

Fasten the rod line leading to the boat to the top ring on the keg, inserting a swivel. Work an eye-splice on the other end to fit over the bitt on the boat. This line is picked up with a boat hook when making a mooring.

The chain connecting the keg to the concrete block should be equal in length to about two and

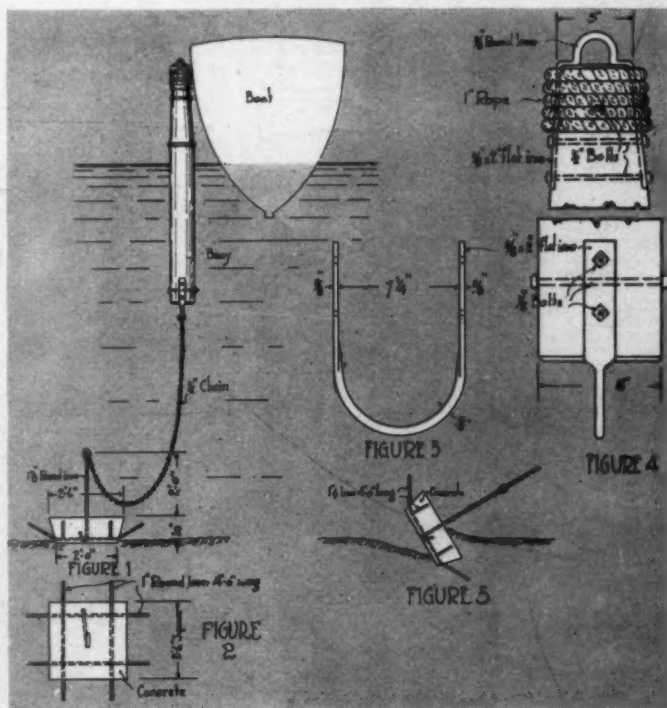


The Chinese anchor, which is "jetted" into a soft bottom, and has almost unlimited holding powers, suggested by Mr. Mills

one-half times the depth of water at high tide. Use 1/2-inch chain for a 30- to 35-foot boat, and 3/4-inch chain for a 35- to 45-foot boat.

Remember to have all parts rather too heavy than too light and examine the chain and fittings occasionally for wear. Repaint the keg each season, and it will remain water-tight and buoyant.

HARRY A. MOTZ, Philadelphia, Pa.



The use of an upright iron embedded in the concrete makes this type of mooring one of the best which can be used, as it practically precludes the possibility of dragging. Mr. Wright's scheme

The Chinese Anchor

ONE of the best, as well as cheapest, anchors for a permanent mooring consists of a stone with a hole drilled through it to take a ring bolt, but if the bottom is sand such that the mooring stone will not bury itself at all, what is known as a Chinese anchor is the best possible solution, although more expensive to put down. This anchor consists of a conical disc of cast iron, as shown in the sketch, the larger diameter being eighteen inches and the smaller six inches, with the depth seven inches. A much smaller size will hold, but for the convenience in putting down this size is satisfactory. In the bottom are two 3/8-inch holes off center and a 2-inch hole on center. A 1/2-inch wire rope is strung through the smaller holes and clipped, its length being about six feet. To this cable the mooring chain is attached.

The larger hole is for the water supply pipe, which is used in "jetting" down. A steam pump or a husky hand pump and a 1 1/2-inch iron pipe are required. The pipe is put down through the 2-inch hole about four feet, and put on the river bottom, a stream of water being forced down the 1 1/2-inch pipe. This dislodges the sand and the anchor is jetted down into the sand for about four feet. The pipe is then removed and as the sand has already filled over the anchor it is ready for use. This type of anchor is used by the army engineers on the Mississippi River and is the only solution yet found for holding successfully in sand bottoms. One of these anchors buried seven feet will hold a 400-ton suction dredge and its pipe line and barges in a three-mile current. In fact, it is impossible to dislodge, as the line or chain will part before the anchor will stir. To remove one it has to be jetted out, a process the reverse of jetting in.

For a hard bottom of blue clay or rack about the best solution is to build up an ordinary crib and fill it with stone and make the mooring chain fast to this crib. Make the crib about ten feet square and if the water is of sufficient depth keep the top of it below the surface two or three feet, so the ice will not carry it out.

W. M. MILLS, Rock Island, Ill.

Cedar Post and Concrete Block

FOR those who are blessed with worldly goods to such an extent that they do not have to economize on matters of this kind, nothing makes a better mooring than a 200-pound mushroom anchor, connected to a factory-made buoy with a 1/2-inch chain, but the rest of us who generally have a little more time than money can make an outfit that will answer the purpose just as well and at less cost.

The accompanying drawing shows a mooring made from a cedar post and a block of concrete. The concrete anchor is made from a sack of cement, well mixed with about four cement sacks of sand and gravel, with enough water added to make a thick paste. Make a form or mold from some boards and bore holes in them for the rods shown on the plan. The rods may be second-hand or new, and should be bent before placing in the mold. When all is in shape

(Continued on page 60)

In the Shops with a Marine Motor

An Explanation of the More Important Steps in the Manufacture of a Typical Engine for the Reader Whose Technical Knowledge of Constructional Methods is Not Encyclopedic

By A. L. Fullarton

(Photographs by courtesy of the Sterling Engine Company)

THE average motor boatman has a pretty accurate conception of how a boat is put together and of what woods are best suited for its different parts, but his knowledge of the motor he puts in it is very often limited to a general idea of its operating principle. Very sketchy, indeed, is his notion of what materials enter into its construction, what machines are used in finishing its various parts, and of the tests to which it is subjected before it was sold to him as a reliable prime mover.

Necessarily, in telling the manufacturing story of a marine motor a good deal must be omitted, not only because factory processes differ, but because a great many of the operations are of minor significance. Thus, to give the name and dimensions of each lathe tool which is used in turning out the shell of a rotary water pump would be fatiguing, although the speed and seemingly human intelligence of the lathe doing this work under the guidance of a skilled operator is interesting enough to watch.

Likewise, if the story is to be kept within reasonable length limits it is impossible to start it at the mines, giving the life history of each metal used; nor is it possible to trace out the thought processes which decide the engineers of a marine motor concern that a certain model with such and such bore and stroke and so much rated horsepower must be built to satisfy a public demand. With these processes eliminated it is well to take up the history of an engine in the drafting-room. Here the ideas of the engineers are put down by trained mechanical draftsmen who lay out the plans and exact dimensions of every part, no matter how small, which goes into the assembly of the motor. Blue prints are made from tracings, and sets of them

are delivered to the pattern department, where full-size wooden patterns are made of all parts which necessity or convenience dictate shall be metal castings.

The various castings in a four-cycle motor include the cylinder block or blocks, with separable or integral heads; the crankcase, the exhaust and inlet manifolds (sometimes incorporated with the cylinders), the pistons and the gears. Except in one or two instances, no marine engine manufacturer in this country feels it worth his while to pour his own castings, the reason being that such a vast amount of material, equipment and space is required for this class of work that its inclusion in a marine motor factory would dwarf the engine side of the business and make the plant, in fact, an iron, brass and aluminum foundry. The patterns, together with their blue prints, are therefore sent out to a regularly established foundry, and the whole process of making the moulds and pouring the metal is taken from the engine builder's hands.

Other parts, such as the drop forgings for the shafts and connecting rods, are generally "farmed" out in the same way, which method also obtains in most automobile factories. It is adopted as a matter of convenience, and because by thus giving some of the rough processes to firms especially equipped for that sort of work, the completed engine can be sold to the purchaser at a much smaller figure than would otherwise obtain. The castings are made by the foundries according to specifications furnished by the engine maker, as above stated, and the composition of the metals is, in most cases, according to the formulae worked out by the maker's engineering department. The motor is, therefore, just as much the product of the concern whose name it bears as if each minute step and

process were carried through under one roof.

A detailed description of the casting process may be omitted, and we take up the story at the rough castings come back from the foundry. The most important of these castings is, of course, the cylinder block, and we shall suppose that we are dealing with a four-cylinder en bloc motor with inseparable head. The casting is in rough condition, but holes for the cylinder bore, the valve chambers and the spark plugs have been left in the casting process, so that the cylinder block differs little in outward appearance from that of its finished state. The casting is first delivered to a milling machine where it is locked in position, and a borer is inserted in the cylinder openings. Milling machines and their near relations, grinding machines, are truly wonderful pieces of mechanism,

which can be adjusted to do almost any work from boring a thirty-second-inch hole to smoothing up the armor plate of a battleship. These machines can be adjusted for drilling vertical, horizontal and diagonal holes and for cutting in two directions on the horizontal plane. When



Drilling cylinder pairs in an up-to-date fashion with a multiple spindle drill

A large milling machine in the Sterling plant used for various machining operations on engine bases of bronze, aluminum or iron

properly handled, moreover, their work is accurate to the ten-thousandth part of an inch.

While in the borer, then, a rough cut of the cylinders is taken, and the block is then removed to a testing-room, where it is put to the water test. In this test the water jacket

casting in case it proves imperfect, is small. Subsequent operations on a perfect cylinder casting include finish cuts in the cylinders, boring out the valve stem guides and inserting bushings, if such are to be used, drilling and tapping the spark plug holes and the valve cap seats, and going over the exterior surface of the block with power-driven emery wheel and hand-file to remove any irregularities left by the sand mould.

As a next step we may consider the work done on the upper half of the crankcase, which we shall assume is of the type which carries the crankshaft and the other moving parts. This casting, according to the work for which the motor is intended, is made of iron, manganese bronze or some aluminum alloy. Each metal has certain advantages, iron being cheapest, aluminum lightest, and bronze toughest and less liable to fracture than either of the others. Most of the machine work on this casting is done on large vertical milling machines, but there are certain operations which require boring apparatus, and this work is best done on smaller horizontal milling machines. The various operations include milling the upper surface on which the cylinder block is to rest, smoothing up the sides to an oil-tight fit for the hand-hole plates, reaming out the main crankshaft bearing boxes, drilling for and setting the studs on which the cylinder block will bolt, and, later, finishing up the camshaft bearing hangers.

Other work on the crankcase consists of boring and truing up the lower half of the babbitt bearings, inserting bronze bushings for the camshafts and making provision for bolting on the lower base or drip pan. To insure accuracy in all this work jigs and fixtures are used

Above: Machining Sterling flywheels on a Bullard grinder

Below: Dipping a crankcase in washing compound to rid it of grease and dirt

An ingenious machine used for rotating a crankshaft and determining by gauge whether or not its balance is perfect

is subjected to hydraulic pressure varying from 50 to 100 pounds to the square inch, and the pressure is applied, after all but one of the water inlets and outlets have been plugged up, by a special gauge-fitted hand pump, which is inserted in a tank of water. It is possible that there has been a defect in the casting, and that there are sand holes in the cylinder bore, which will leak under pressure. Should this be the case, even the smallest amount of moisture on the inside of the cylinder bore will condemn the casting, and it will be sent back to the foundry for melting as scrap. The testing is done at this stage of the process because the rough bore removes nearly all of the metal which must be cut away, thus rendering the detection of any defect almost certain, and also because the amount of time and labor wasted on the

wherever possible.

The lower base which bears no weight and is used only to trap the oil under the crank throws or to convey it back to the oil sump, is often made of aluminum, and is a light casting and one which requires little finishing. Its upper edge is, like the lower surface of the crankcase, machined to an oil-tight finish, and the holes for the studs which secure it to the base are drilled and tapped.

These operations completed, the large parts of the motor with the exception of the manifolds are all taken care of. No great amount of work is required for these, and when the holes for connections have been drilled and tapped and the outside finished up for appearance sake, they are put away in the stock room with the other large castings. Some are and some are not water-jacketed.

(Continued on page 58)



New Kermath Unit Power Plant

The Famous 12 H. P. Model Being Brought Out for 1916 with Rear Starter and Reverse Gear Integral—Unobstructed Handhole Plates Another Valuable Improvement

THE Kermath Mfg. Co., of Detroit, Mich., is building a 12 h.p. model for 1916 in the unit type in which a complete enclosure of the engine and reverse gear is made. The camshaft and magneto shaft in this new model are

driven with silent chains, eliminating all noise from this point. Another feature is the complete enclosure of the rear starting chain and

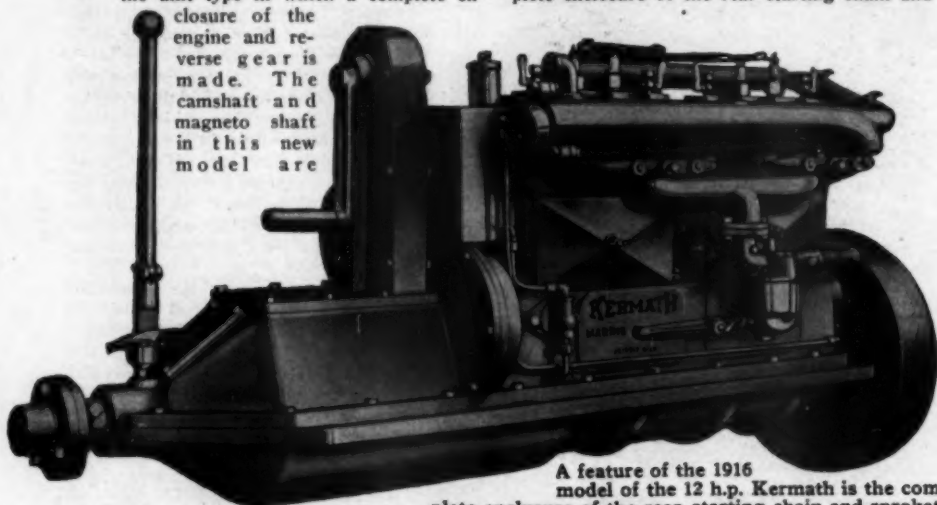
sprocket, permitting these parts to operate in oil with a minimum of friction.

On the 1916 model, also, handhole plates are provided on both sides of the base, with nothing mounted on them, and the magneto and the water pump are carried high enough so that there is nothing in front of the plates which will interfere with instant access to the interior of the crankcase. The oiling system is notable in that it not only takes care of the entire motor, but also the reverse gear which is of the planetary type using very heavy stub teeth and a five-plate multiple disc forward clutch. The exhaust manifold is completely water-jacketed and the intake manifold which is cast with it takes heat from it.

The oil tank has been placed on top of the chain housing instead of in the base of the engine as in the previous Kermath unit plants, with the sight feed mounted on top of the reservoir.

When an electric starter is desired it is mounted on top of the reverse gear case in place of the rear starter, and the silent chain drive is enclosed and operates in oil.

These motors have 3½-inch bore by 4-inch stroke and are built to operate at speeds from 600 to 1,200 r.p.m.



A feature of the 1916 model of the 12 h.p. Kermath is the complete enclosure of the rear starting chain and sprocket, permitting them to operate in oil

The Three-Cylinder Frisbies

I-Head Motors in 12-18 and 18-25 H. P. Sizes Having Manifolds Cast Integrally with the Cylinders—Prominent Features Include Balanced Crankshaft and Large Bearing Surfaces

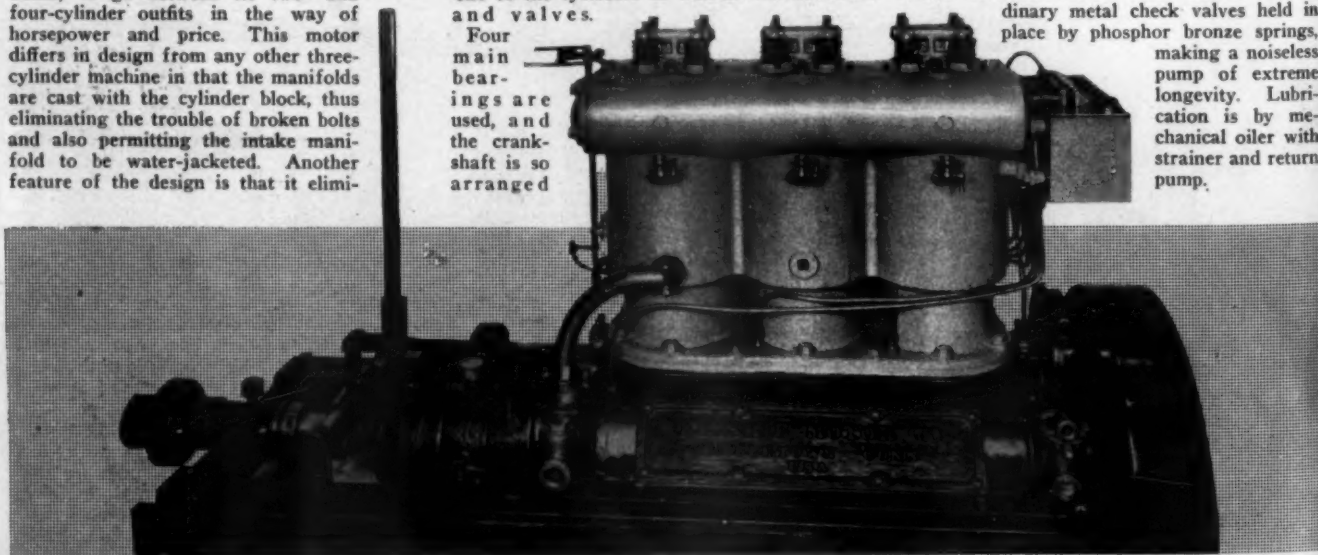
THE three-cylinder motor shown here-with is a machine brought out by the Frisbie Motor Co., of Middletown, Conn., to go between its two- and four-cylinder outfits in the way of horsepower and price. This motor differs in design from any other three-cylinder machine in that the manifolds are cast with the cylinder block, thus eliminating the trouble of broken bolts and also permitting the intake manifold to be water-jacketed. Another feature of the design is that it elimi-

nates all water pipes for circulating water, the cylinder jacket being so cast that it is open throughout the whole casting around each one of the cylinders as well as the manifolds and valves.

Four main bearings are used, and the crankshaft is so arranged

that the power impulses are applied to it at equal intervals, thus minimizing vibration. The circulating pump and the bilge pump are provided with flat rubber discs instead of ordinary metal check valves held in

place by phosphor bronze springs, making a noiseless pump of extreme longevity. Lubrication is by mechanical oiler with strainer and return pump.



Starboard side of the three-cylinder Frisbie showing the mechanical oiler, water pump, etc. The motor is of the valve-in-head type having the two manifolds cast in one unit on the opposite side of the machine

The Latest Four-Cylinder Gray

The Model D Jr. Which is Put Out with 3x4-Inch Block Cylinders and Which is Rated at 12-15 H. P.—Thorough and Positive Pressure Oiling System Premier Feature

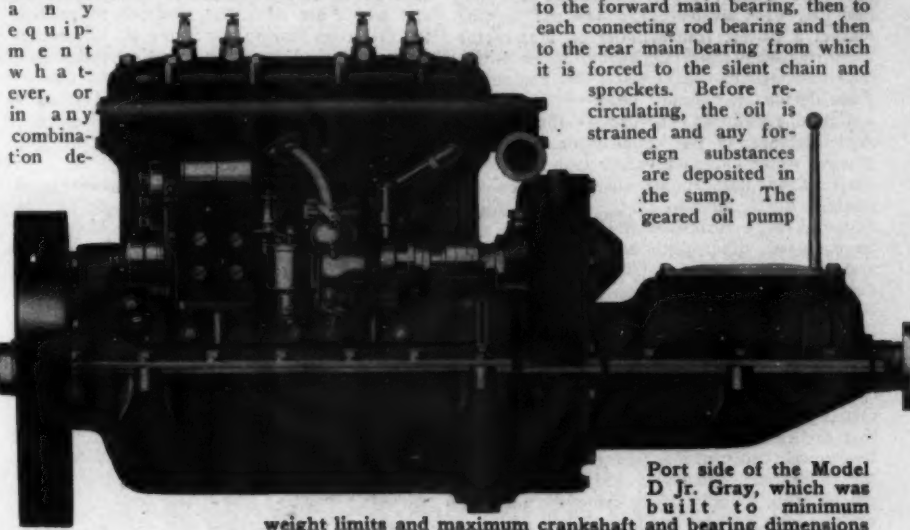
A QUITE remarkable combination of merit and value has been developed by the Gray Motor Co., of Detroit, Mich., in its new Model D Jr. four-cylinder four-cycle engine. This model is also built in two cylinders, but the four-cylinder size is considered more important as it is rated at a power which has a more universal field for motor boat owners. This motor which has cylinder dimensions of 3 x 4 inches was originally rated at 10-12 h.p., but subsequent tests have proved so satisfactory as to warrant rating it at 12-15 h.p.

The makers' instructions to its designing department were greatest possible power, least weight, extreme compactness and lowest possible cost of manufacture. These four factors are pretty hard to embody in one design because they mean the biggest possible valves, liberal bearings throughout, a stroke that is not so long as to make the engine top-heavy, but long enough to insure efficiency, and the shortest possible dimensions over all. All this necessitated bearings of large diameter, with space saved wherever practicable, special material where added strength is required, and at the same time the elimination of every unnecessary pound.

Taking these things into consideration a crankshaft of 2 1/4-inch diameter has been provided and a 1 1/2-inch camshaft. The valves are 1 1/4 inches in the clear. The camshaft and pump and magneto drive shafts are operated by silent chains as in the Model D Gray which this motor resembles in some, although

not all respects. The weight of the complete unit power plant including magneto and built-in reverse gear is about 400 pounds; the motor can, of course, be obtained without a n y e q u i p m e n t w h a t e v e r, or in a n y c o m b i n a t i o n d e-

The premier feature of the Gray Jr. is the positive pressure lubricating system having the crankshaft drilled laterally through the webs and crankpins so that the oil is forced to the forward main bearing, then to each connecting rod bearing and then to the rear main bearing from which it is forced to the silent chain and sprockets. Before recirculating, the oil is strained and any foreign substances are deposited in the sump. The geared oil pump



Port side of the Model D Jr. Gray, which was built to minimum weight limits and maximum crankshaft and bearing dimensions

sired by the customer. The Model D Jr. is designed to accommodate an electric starter or an elevated rear hand starter. It can also be furnished with timer and coil ignition or with magneto.

is provided with a pressure regulator and there is an oil level gauge so located that it is a positive indicator of the amount of oil at the suction inlet. All parts are copiously oiled, no matter what the angle.

The 120 H. P. Nlsecro Diesel

Powerful Heavy-Duty Marine Motor of the Full Diesel Type, Having Air Starting with Mechanical Reverse and Many Improved Features—Part of an Extensive Line

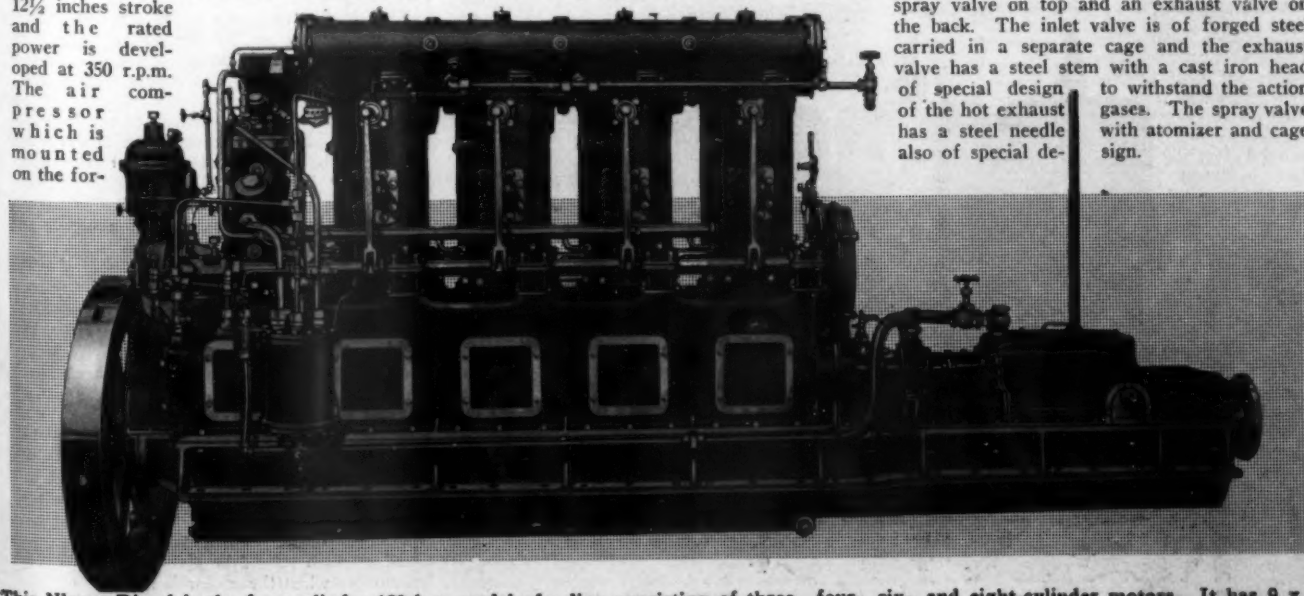
THE New London Ship & Engine Co., of Groton, Conn., has made great strides in the development of its Nlsecro Diesel engines, the latest design being the Model II, built in ten sizes from 60 to 480 h.p., of which the 120 h.p. four-cylinder size is shown in the accompanying illustration. This motor is of the heavy-duty type with air starting and with mechanical reverse gear and clutch. The cylinders measure 9 inches in diameter by 12 1/2 inches stroke and the rated power is developed at 350 r.p.m. The air compressor which is mounted on the for-

ward end of the motor is of the two-stage tandem type, and provision is made for regulating the pressure carried in the spray air by means of a throttle on the first-stage suction. The two air compressor cylinders are of cast iron in one piece, water-jacketed, and there is a separate water-jacketed cast iron second-stage head. The air cooler, placed on the back of the engine, has separate passages for first- and second-stage air and has sufficient

surface thoroughly to cool the air after each stage of the compression. A spray air flask is secured to the back of the engine and is connected into the line between the compressor and the spray valves.

The working cylinders are of cast iron with water-jacketed valves and heads. Each cylinder head is cast integrally with its barrel and contains all of the valves, comprising an inlet and a relief valve on the front, a spray valve on top and an exhaust valve on the back. The inlet valve is of forged steel carried in a separate cage and the exhaust valve has a steel stem with a cast iron head of special design of the hot exhaust has a steel needle also of special de-

to withstand the action gases. The spray valve with atomizer and cage sign.



This Nlsecro Diesel is the four-cylinder 120 h.p. model of a line consisting of three-, four-, six-, and eight-cylinder motors. It has 9 x 12 1/2-inch cylinders and develops its rated power at 350 r.p.m.

The New 10 H.P. Four-Cycle Ferro

A Four-Cylinder Motor Notable for Its Simplicity of Construction and Accessibility of Its Parts—Cast in Three Pieces in Order to Minimize the Effects of Vibration

TO meet a growing demand for a four-cycle engine to be used in lighter pleasure craft, the Ferro Machine & Foundry Co., of Cleveland, O., has put on the market a 10 h.p. four-cylinder en bloc motor known as Model No. 10, having $2\frac{3}{4}$ x 4-inch bore and stroke. Features of this engine include detachable cylinder head, carbureter installation permitting the use of the hot air generated around the exhaust manifold and plunger water pump operating from the camshaft at one-half engine speed. Either the straight Bosch ignition or the Duplex Bosch system will be furnished and the engine will be equipped either with an electric starting system or overhead starter as the customer desires. Other specifications are as follows: Rotative speed 800-1,000 r.p.m., $2\frac{3}{16}$ -inch front bearing and $2\frac{3}{4}$ -inch rear bearing, $1\frac{3}{4}$ -inch crankshaft, 12-inch flywheel, etc., etc.

This motor is notable for its simplicity of construction and accessibility of parts. It is cast in three pieces with the result, it is stated, that the effects of vibration are considerably less than in most marine engines. To reach the crankshaft, connecting rods, camshaft, etc., it is only necessary to remove a plate on one side of the engine, while on the other side the valve springs are reached in a similar manner. The reverse gear cover is easily removed, allowing quick and free access to that part of the mechanism.

A feature of the new Ferro is the oiling system, the circulating method of splash lubrication being used. The oil is drawn from the base by a pump and forced to the end com-

partment where its delivery is regulated by a sight feed. The crankcase is provided with troughs or depressions under each connecting rod which are of sufficient depth to prevent the oil from flowing from one pit to another unless splashed by the connecting rod.

In line with the crankpits on either side of the case are inclined troughs which deliver the oil from one pit to the one next aft. The oil collects in the first depression

until it rises to a point to where it is splashed by the dipper on the connecting rod, being carried back to the next pit and to the third and fourth in similar manner. Thus the amount of splash is independent of the length of the dipper and depends only on the rate of flow of oil by the sight feed, so that the sight feed adjustment gives entire control of the system.

Summing up, the latest Ferro is a compact, strong, light engine, designed especially for the small speed boat, small hydro, fast runabout and family boat where comfort, cleanliness, power, and speed are essentials.



The exhaust and inlet manifolds are cast in one piece, permitting the heated air from around the exhaust pipe to be led to the carbureter to assist in vaporization

A Recent Roberts Model

A 15 H. P. Machine of the Two-Cycle Type Built in Three Cylinders—Flexible High-Speed Motor Which is Fitted with a Patented Device Designed to Make Back-Firing Impossible

THE Roberts Motor Mfg. Co., of Sandusky, O., has recently increased its line with the addition of a three-cylinder 15 h.p. motor, known as the Model 3M. This motor has a bore and stroke of $4 \times 3\frac{1}{2}$ inches and develops its rated power at a speed of 1,000 r.p.m. It is declared to be a much more powerful, speedier and more flexible motor than this company has ever turned out before.

As shown in the accompanying illustration it is equipped with Bosch magneto and with standard timer head in addition. The cylinders are fitted with two spark plugs

each, so that a battery system of ignition can be used in addition to the magneto. Four different styles of ignition can be supplied on this motor—namely, the standard coil and timer, the Delco system, the Atwater-Kent battery ignition system or the Bosch high tension magneto. A unique and very desirable method of attaching the magneto is used, the magneto being retarded bodily about the timer column, this movement rotating the armature of the

magneto instead of moving the distributor.

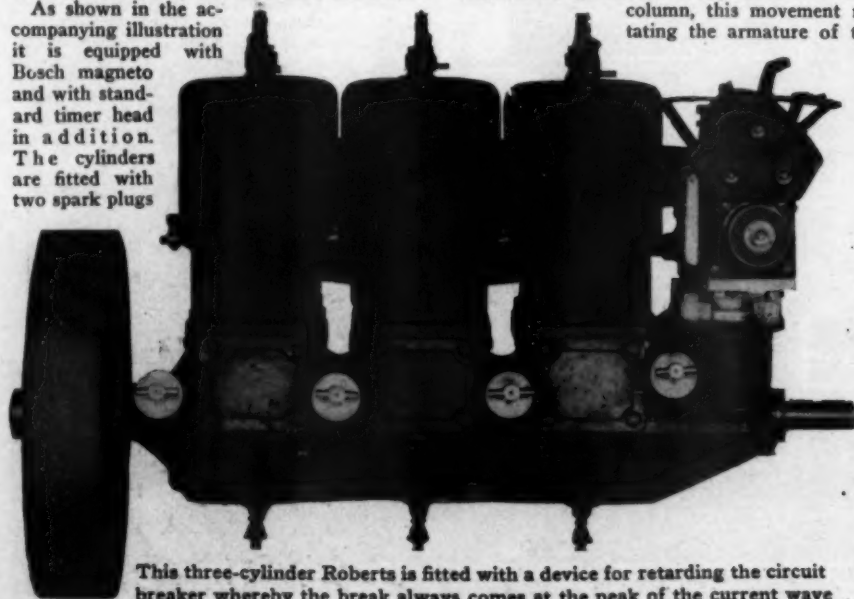
By the Roberts method of advancing and retarding the spark, the circuit breaker is always set so that the break comes at the point of highest pressure in the current wave, giving a spark of maximum efficiency not only at full advance, but at full retard or any intermediate position.

The timer and pump gears are completely enclosed. They are of the helical type and run in grease, so that they are practically noiseless in operation and should wear a lifetime.

One of the strongest features of the Roberts motor is a patented device which is declared to make back-firing absolutely impossible. The motor is said to be extremely flexible and to run at a much higher speed than is standard in two-cycle practice, making it an admirable choice for light and speedy types of boats.

The lubrication of this and other Roberts motors is an extremely simple proposition. As they are of the two-cycle type, it is merely necessary to mix three pints of oil to every five gallons of gasoline, after which the entire lubrication of every working part is automatically furnished in copious manner. Thus there are no sight feeds to watch and regulate, while there is no danger of running short of oil, for as long as the motor gets fuel on which to run, the lubrication is positive to the last revolution. The main bearings are fitted with cups for hard grease, and these have T handles which should be given one turn every hour or so when the motor is new.

Roberts motors range in size from 4 h.p. to 350 h.p.



This three-cylinder Roberts is fitted with a device for retarding the circuit breaker whereby the break always comes at the peak of the current wave

From MOTOR BOATING Readers

This department of MoToR Boating is maintained for the purpose of giving its readers opportunity to ask questions, reply to other correspondents' communications and submit ideas, suggestions, opinions or experiences which may be of interest and assistance to motor boatmen. There are no rules governing the department other than that postage must be enclosed when an answer by mail is desired, and that the name and address of the writer must be given in each instance. No anonymous contributions will be considered for publication, but initials or a pseudonym will be substituted for the writer's own name if the request be made. The editor does not, of course, hold himself responsible for statements made or opinions expressed by contributors to this department.

Last Year's Records

To the Editor of MoToR Boating:

In preparing certain data covering the motor boat season of 1915, the writer would be pleased to have your impartial opinion of the best ten motor boat performances which took place during the past season, the names of the boats, the engines, the distances and the time. We have a certain amount of this data at hand but fearing our list may show partiality, we are asking for your assistance so that we can arrange a list that is absolutely unbiased.

B. M. Co., N. Y. City.

[It would be possible to give almost an infinite number of different answers to this question, no one of which would be better than the other, unless the question was qualified to some extent.

It is hardly fair to compare the performances of a cruiser in a race against a hydroplane if it is speed records you are after. The performances of some of the cruisers and even some of the open boats in the races of last summer were fully as creditable, all things considered, as those of the hydroplanes.

Of course, the performance of Disturber IV at Chicago in September stands out head and shoulders above any other event in the history of the world. Her half-mile dash at the rate of 61.503 miles per hour and her 30-mile race with an average speed of 54.326 miles an hour, are both worthy to be included among the best ten performances of 1916.

Tech Jr.'s performances at Manhasset Bay on August 18, 1915, stand next in our estimation. As you know, this race was held under admiralty conditions over one nautical mile, that is, the boat was obliged to run three times in each direction in order to counteract any current advantage and then the average of the six runs was determined. Tech's average speed under these conditions was 53.7 statute miles per hour.

The performance of Flyaway III in the 270-mile race on June 17 from New York to Albany and return is well worthy of a place in history. This run, half of which was made in the night down the treacherous Hudson River, was done in 12 hours, 54 minutes and 37 seconds.

In the Albany race of 270 miles' length, Eastern Star, on open boat, owned by E. L. Finch, and powered with a 60 h.p. Loew-Victor motor, made the run in 14 hours 46 minutes and 50 seconds. This feat for an open boat has never before been even approached.

For the remaining best five performances, there is little choice, and I would suggest that you take your pick from the summary of the

American Power Boat Association sanctioned races for 1915.

Nothing startling happened at the Mississippi races last year. A speed of 39.2 miles per hour was made by Buffalo Enquirer in the 25-mile free-for-all at Hannibal, Mo. The performance of Miss Detroit in the Gold Cup races was not as good as that of Baby Speed Demon II in the same races the year previous. This year Miss Detroit's best race was of 30 nautical miles and averaged 48.5 statute miles per hour.

On the Pacific Coast Oregon Kid did the best. In one 20-mile heat of the free-for-all race she averaged 39 miles an hour. Oregon Kid is powered with a 135 h.p. Van Blerck motor.

For the hydroplane championship of the Delaware River Cahetis II averaged 28½ miles an hour.

In the mile championship of South Jersey, Tech Jr. averaged 52.37 miles an hour under admiralty conditions. In the 368½ nautical mile ocean race from Baltimore to Camden, Dora II carried off the honors. This was a creditable performance considering the fact that this boat is only 30 feet long and powered with a two-cylinder 7 h.p. motor. Dora was en route 53 hours 5 minutes and 50 seconds in covering the distance, a major portion of which required outside running.]

More About Flags

To the Editor of MoToR Boating:

One Sunday during the past summer three of our boats were made fast to the dock on Calumet River, near Riverdale, and all three owners happened to be flag officers of our club; the boats are of the cruiser type with bow and stern flag staffs and a signal mast fitted with port and starboard spreaders stepped amidships. The Union Jack was at the bow, the flag officer's distinguishing flag was at the mast head, and the ensign at the stern. As there were no other boats of our fleet present except flag officers' boats, the club ensign was flown from the starboard spreader to identify the club to which the boats belonged. The question is whether or not it was proper under these circumstances to fly the club ensign. It appears quite logical that such practice cannot be far wrong, but as we have no authorities here on the subject I hope you will give the matter consideration and advise me.

I can understand that, had there been other boats present whose captains were not flag officers, it would have been an easy matter for any passer-by to conclude that the flag officers were attached to the club whose burgee was flying on the boats other than flag officers' boats.

G. W. S., Chicago, Ill.

[You are right in what you say in regard to the fact that yachting etiquette is amiss in making no provision for the identification of

the club to which a boat belongs when the owner happens to be a flag officer, and the boat is at anchor on a Sunday or holiday. This, of course, is a great misfortune, but on the other hand, we are of the opinion that the flying of the club flag from the starboard spreader cannot be justified. We believe it would have been far better not to have flown the Union Jack at all under these circumstances, but to have flown your club flag from the bow staff, as you ordinarily would when at anchor and always would have when under way. The practice of flying the Jack, while perfectly correct, is handed down to us from the days when a majority of the boats were sailing craft and flew their flag from the mast head. In fact, at the present time yachting etiquette as provided in the New York Yacht Club rules, and those of the Eastern Yacht Club and one or two other clubs, still insists that the club flag must be flown from the mast head of single-masted vessels, and that it is permissible to fly nothing except the Jack from the bow or Jack staff. Single-masted motor boats belonging to these clubs are obliged to fly their club flag from the mast head to comply with the etiquette of their club.

To quote from the New York Yacht Club rules, the following may be of interest to you: "Distinguishing marks of a yacht in commission, other than the yacht ensign, are a burgee and a flag or private signal. When under way, single-masted yachts, ketches and yawls should fly the private signal at the main truck; when at anchor, the burgee. The distinguishing flag of a flag officer is always flown at the main truck, both day and night."

Naturally, the above procedure had to be arranged to meet the requirements of the modern motor yacht, and a majority of the clubs therefore have recognized the use of the club burgee at the bow. However, no authority has yet made it permissible to fly any flag from the starboard spreader, other than the absent flag and the owner's meal flag.

A number of clubs have adopted distinctive flag officers' flags, using for these a combination of the club signal worked into a rectangular form, and adding to it the three stars for commodore, two for vice- and a single star for rear commodore. Sometimes they have retained the flag officers' colors, as well; that is, blue for commodore, red for vice-commodore and white for rear commodore, although it is not absolutely necessary to do this, as the stars are an indication of the rank of the officer. Such an arrangement, you will see, obviates objections similar to the case which you cite,



A 55-foot cruiser, built by the Richardson Boat Co., of North Tonawanda, N. Y., for W. F. Berry, of Medina. The illustration shows the cruiser on the new Erie Canal, where it crosses Oak Orchard Creek at Medina

that on some occasions it is not possible to fly any flag which will be an indication of the club to which the flag officer belongs.]

Restoring Oak Trimming

To the Editor of MoToR Boating:

Will you kindly advise me as to how I can restore the oak trimming on my boat to its natural color? After having gone through last summer and standing all winter it has become very dark.

This is what I did last year: I bleached it with oxalic acid, then scraped it down and sandpapered it, removing the bleach with vinegar, and then applied the varnish, but I did not get the desired result. So if you will advise me, I should like very much to know what the general custom is for applying the varnish in order to bring out the grain, and also hold for the entire season.

R. B., Rutherford, N. J.

[We take it from your letter that you endeavored to bleach the wood before you had scraped it down or sandpapered it. This is the reverse order from which the work should be done, that is, all traces of the old varnish or paint should be first removed from the oak by means of scraping or by varnish remover, and after this has been done and the oak cleaned up it should be then bleached with oxalic acid. The oxalic acid should preferably be applied when there is a good bright sun shining on the oak, and after it has remained there an hour or so, the acid should be neutralized by vinegar or some other neutralizing agent. We believe in this way you will have no difficulty in obtaining a good finish to your brightwork. At least three coats of varnish should be applied to the wood before the boat is put overboard. It will also be necessary to go over this at least once a month during the season if you wish to continue to look in the best of condition.]

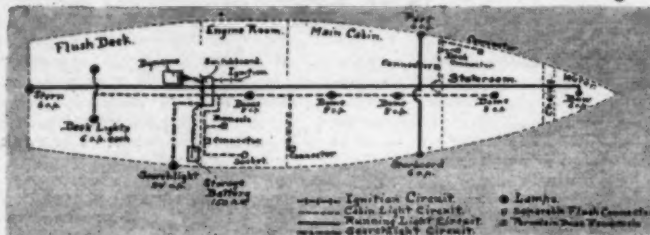
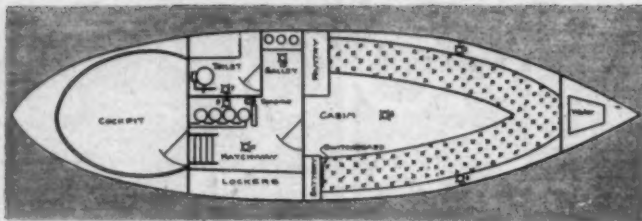
Where Does the Slip Increase?

To the Editor of MoToR Boating:

Will you kindly enlighten me on the following subject? I have a motor in my boat which develops its proper power at 1,000 r.p.m. and in order to approach this speed I have to use a small diameter propeller. What I should like to know is, does the slippage of a propeller proportionately increase with the increased number of revolutions, or does it decrease, owing to the increased solidity of the water at high speed, provided, of course, that the weight of the boat is not unreasonably great for the size of the propeller?

To be more specific, my boat is a raised-deck light cruiser 37 x 8 x 2 feet 6 inches; the motor develops about 35-40 h.p., at 1,000 r.p.m.; the propeller is 18 x 26 inches and at 700 r.p.m. gives me a speed of over 9 miles an hour. Would a 20 x 22-inch propeller at 700 r.p.m. give better results than the 18 x 26 at somewhere near 1,000 r.p.m.?

E. W., Milwaukee, Wis.



A wiring scheme for electric lights, suggested for a cruiser

[We do not believe that under any consideration the argument that the slip increases proportionally with the increase in revolutions will hold good, nor is the converse true.

With every hull and particular power plant there seems to be a value of slip which gives the best results, or in other words, generally speaking, the greatest efficiency can be obtained from a hull and power plant with the propeller working at from 17 per cent. to 24 per cent. slip. A slippage of either less or more than this range is generally accompanied by a loss of efficiency somewhere in the outfit. Of course, there have been boats which gave very good results with a slip of less than 17 per cent. and again there are types of boats which necessarily must work at slips even above 30 per cent. for the best results. You can easily imagine a case where a wheel could be designed to run at zero slip, but in such a theoretical case the speed of the boat through the water would be practically zero, and as boat speed is generally the object sought with any outfit you will see that propellers are generally designed to give the greatest boat speed.

We do not believe your theory, that is, that the slippage decreases with the increase in r.p.m. owing to the increase in solidity of the water at high speed, holds good on account of the fact that as the r.p.m. is increased cavitation becomes greater and greater until at high rotative speeds, unless the boat is light and can get away from the propeller, so to speak, in order that the flow of water to the propeller will be greater than the flow of water away

from the propeller, the density of the water will be so small that little forward thrust can be obtained. In such a case the value of the apparent slip will be very high.

In your case you ask us whether a 20 x 22-inch propeller at 700 r.p.m. would give you better results than a 18 x 26-inch propeller at 1,000 r.p.m. We feel quite positive that it would give you fully as good results any way. A 35-40 h.p. motor should give you decidedly better speed than 9 miles an hour. We should expect at least 11 and perhaps more, especially as you say your boat is very lightly constructed. A propeller with 26 inches pitch, working at 1,000 r.p.m. and only giving a speed of 9 miles an hour is certainly inefficiency of the highest order.]

A Wheel for a Dory

To the Editor of MoToR Boating:

I am a reader of your valuable magazine and would like a little information. I have a 2 h.p. motor in a 16-foot dory, 3-inch bore and 3-inch stroke, and it is supposed to turn up 1,000 revolutions per minute. Will you kindly advise what size and pitch propeller I should get for best results, either two- or three-blade? Also advise what you think of a weedless, as this boat is used in a pond where there are more or less weeds later in the summer.

J. C. M., Fall River, Mass.

[With your 16-foot dory, powered with a 2 h.p. motor, turning 1,000 r.p.m., we would suggest a propeller having two blades 12 inches in diameter by 12 inches pitch. If you are in the habit of using your boat in waters where there are more or less weeds, it will be advisable to use a weedless propeller.]

An Excellent Type of Sea-Boat

Opitsah (Chinook Indian term for Sweetheart) was designed by her owner, B. N. Crouch, of Magnolia Park, Houston, Tex., corrected, checked and sketched by the naval architect, Carlton Wilby, and built under the personal supervision of her owner.

She is the exponent and answer, by a student of years of cruising and building, for efficiency, comfort and economy.

Aside from her completed details, superior construction of selected materials, etc., she is a wonderfully balanced and capable sea craft, having been thoroughly tried out in the fall storms on Lake Michigan and winter storms on Gulf of Mexico, and in her maiden trip of over 3,000 miles showed herself relentless in endurance and satisfactory accounting.



Opitsah, a 45 by 11½-foot cruiser of the double-cabin type. She is powered with a Lamb motor

Among the Clubs

Great Activity in the Yacht and Motor Boat Clubs Already Forecasts a Big Season—
Racing Schedules Being Announced and New Boats Put Overboard

Club Elections

Del Rey Motor Boat Club

Commodore, Harry Stansfield; Vice-Commodore, G. Belz; Rear Commodore, Omar C. Reber; Fleet Captain, Walter C. Jabusch; Weigher, E. Claus; Fleet Surgeon, Dr. F. J. Clippert; Board of Directors, J. Miller, Chairman; A. B. Benjamin, F. J. Fess, Wm. Zanhov, Grover C. Reber.

Racine Yacht Club

Commodore, F. W. Herman; Vice-Commodore, Wm. Dager; Rear Commodore, L. Wardman; Fleet Captain, G. O. Panch; Boatswain, F. Bohn; Fleet Surgeon, Dr. W. C. Hanson; Secretary, H. Jensen; Treasurer, D. G. Chandler.

Bergen Beach Yacht Club

Commodore, H. J. Hildebrand; Vice-Commodore, Geo. L. Ford; Rear Commodore, Wm. W. Pynn; Treasurer, J. C. Snackerberg; Financial Secretary, Chas. P. Shinn; Recording Secretary, Frederick C. Haab, Jr.; Measurer, John Lindstrom; Board of Directors, Wm. B. Andrews, E. E. Wells, Fred J. Hopper.

Peoria Yacht Club

Commodore, J. A. Duffee; Vice-Commodore, John Vonachen; Rear Commodore, Thos. J. Walsh; Secretary, Phil Becker, Jr.; Treasurer, Wm. Echert; Directors, J. W. Emerson, John Garside, Carl Harms, M. J. Dorsey, L. E. Selby.

Oriente Yacht Club

Commodore, Henry Moore; Vice-Commodore, Adolph Heerr, M. D.; Rear Commodore, Swenson J. Brooks, M. D.; Treasurer, John W. Roberts; Secretary, Joseph Bister; Chairman Race Committee, Wm. S. Johnson; Trustee, Donald G. Ross.

Baltimore Corinthian Yacht Club

Commodore, W. W. Varney; Vice-Commodore, Roger G. Broome; Rear Commodore, Charles P. Crane; Secretary, Lieutenant, J. M. Mittendorf; Treasurer, C. D. Swank; Board of Trustees, Graham Eckel, Harry Beibach, J. F. Bromberg, G. Porter Houston, W. W. Estep, G. K. Michel, E. F. Rodgers, J. C. Gilbert, J. H. Mittendorf, C. D. Swank, Dr. W. J. Swank, W. W. Varney, Roger G. Broome, F. W. Euler, Charles P. Crane and J. D. Rogers.

North Hudson Yacht Club

At the annual election of officers of the North Hudson Yacht Club, held at their clubhouse at Wood-cliff-on-Hudson, N. J., the following officers were elected to serve for the ensuing year: Commodore, Jos. F. Mallard; vice-commodore, Frederick W. Loeher; recording secretary, John J. Donnelly; financial secretary, Henry C. Weeber; treasurer, F. T. Mallard; fleet captain, Chas. Happe; trustees, C. W. Clayton, Geo. Roeder, Peter Cumler; regatta committee, August Roeder, August Nickel, Geo. Bieher.

Bentley Yacht Club

At the annual meeting of the Bentley Yacht Club, held recently, the following officers were elected for the year 1916: George W. Moore, commodore; A. W. Slaight, vice-commodore; H. H. Constantine, rear-commodore; W. J. Russell, financial secretary; M. B. Skidmore, recording secretary; P. E. Okeson, treasurer; A. Okeson, fleet captain; Charles Sterling, harbor master.

Wethersfield Cove Yacht Club

The Wethersfield Cove Yacht Club held its annual meeting recently at the clubhouse. Officers for the coming season were elected as follows: Philip Gruntler, commodore; James P. Filkin, vice-commodore; B. F. Roeben, rear-commodore; William H. Lankton, secretary and treasurer; trustees for two years, A. Henry Gruntler and Louis F. Stetzner.

After the business meeting the club sat down to a banquet which from the way the good things disappeared was thoroughly enjoyed.

The club had as its guest Captain John Pugsley of Riverhead, L. I., one of the charter members of the yacht club in that place.

Cedar Rapids Motor Boat Club

At the recent annual meeting of the Cedar Rapids Motor Boat Club, the following officers were elected for the ensuing year: S. J. Van Kuren, commodore; Hall Orr, vice-commodore; Wm. E. McPann, rear-commodore; Mark J. Myers, treasurer; I. M. Preston, secretary; John Schultz, fleet captain.

Columbia Yacht Club

The following officers have been elected to the Board of Trustees of the Columbia Yacht Club, New York City: J. McKimlay Wight, Walter Lüttgen, Joseph W. Whiteside, H. L. Freeland and Thomas H. Wheeler.

Commodore Berg has appointed Andrew J. McIntosh, fleet captain; Dr. Daniel B. Brinsmade, fleet surgeon, and the following members to constitute the race committee for this year: Charles H. Moore, chairman; Dr. D. B. Brinsmade, Charles F. Müller, Edwin A. Shewan, Joseph H. Wallace. The opening race will be held on Saturday, June 3.

San Francisco Yacht Club

The officers of the San Francisco Yacht Club for 1916 are as follows: John Barneson, commodore; Carlton Earl Miller, vice-commodore; Frank M. Garden, secretary; Philip J. Fay, treasurer; Wilfred Page, financial secretary; James Lanagan, director-at-large; F. A. Robbins, director-at-large.

News from the West

Elaborate plans and preparations are being made by the Duwamish Launch Club of Seattle for the coming year and from all indications it is about to enter on the greatest period of activity in its history. At the annual meeting the following officers were elected:

Commodore F. H. Harriman; vice-commodore, C. Selby; rear commodore, H. Lindholt; fleet captain, Judge J. E. Carroll; secretary and treasurer, H. C. Brown; trustees, Harriman, Selby, Lindholt, Brown and J. A. Williams. The club will hold a regatta during the year to celebrate the sixth anniversary of its existence.

A new motor yacht will make its appearance among the boats of the Seattle Yacht Club during the early spring. It has been planned by Capt. H. B. Lovejoy for J. D. Esary of the Inland Navigation Company. Mr. Esary's boat will be 75 feet in length with a beam of 15 feet 8 inches and 4 feet 4 inches draft. A 70-80 h.p. six-cylinder Winton will be installed, which will be ample to take the vessel 12 miles per hour. The boat will be equipped throughout with every convenience.

Commodore Perkins of the Tacoma Yacht Club, has appointed the following committees for this year: House committee—Franklin Fogg, A. R. MacLean, Harry Pelletier; Regatta committee—K. K. Rathfon, J. C. Sallen, Neil McKenzie, Nic Babare, Dr. W. E. Lowrie; Membership committee—Fred Davis, S. E. Crocker, W. B. Jacobs, J. A. Scholl, H. Watson. Press committee—R. C. Doud and Bert Coleman. Dr. H. J. Whitaker is fleet surgeon; L. A. Jacob, port captain; C. S. Lyons, judge advocate; C. A. Darmer, measurer; W. H. Crump, librarian.

General News

An Attractive Club Book

The Sheepshead Bay Yacht Club of Brooklyn, N. Y., is preparing for a busy season. The club has recently published an attractive booklet which sets forth the advantages of Sheepshead Bay as a motor boating center. It is illustrated by photos of the bay and the motor boats of some of the members. The secretary (J. B. Adams, 1400 Dean St., Brooklyn), will mail a copy to those who are interested, upon application.

Mississippi Valley Races at St. Paul

The Mississippi Valley Power Boat Association has selected St. Paul, Minn., as the location for its annual regatta this year, the dates being July 3, 4 and 5. The race committee of the Valley Association got together recently with representatives of the St. Paul Association of Commerce, the Commercial Club, the Athletic Club and the St. Paul Motor Boat Club, and perfected plans for one of the biggest valley regattas ever held. St. Paul offers a well protected course right in the heart of the city, which will no doubt draw together a large aggregation of racing craft and spectators. A number of new boats are building for the valley classes, and it is expected that a number of the fastest hydroplanes of the country will enter. However, to be assured of the entries of the principal motor boat racing men of the country, it will probably be necessary for the regatta committee of the Mississippi Valley Power Boat Association to modify its cash prize requirements on account of the fact that should the racing men enter the St. Paul races where it is announced that there will be many thousands of dollars given away in cash prizes, they will be automatically disqualified from competing in the other big racing events of the year where only amateurs are allowed to compete.

Long Island Sound Clubs Get Together for a Week's Cruise

For the first time in history the twenty-four clubs in the Long Island Sound Yacht Racing Association, together with the Long Island Sound Power Boat Association and the New York Yacht Club have joined hands and this year will have a week's cruise on the Sound as an experiment to test out the practicability of the scheme. The idea that all yachting interests on the Sound should work together in the interest of the sport was first conceived by the Seawanhaka-Corinthian Yacht Club and upon its invitation the Indian Harbor Yacht Club, the Black Rock Yacht Club, Stamford Yacht Club, Manhasset Bay Yacht Club, and the Huntington Yacht Club had a joint meeting at the New York Yacht Club to discuss the project, and it was decided that these clubs would act as hosts and invite the other clubs of the Long Island Sound Yacht Racing Association and the Long Island Sound Power Boat Association, together with the New York Yacht Club to join with them in a week's cruise. The cruise will take place from June 26 to June 30, and will be further extended to July 4 to take in a number of racing fixtures which are scheduled at that time.

The fleet of motor and sailing yachts will rendezvous at the Seawanhaka-Corinthian Yacht Club on June 25 and on the following day will proceed to the Indian Harbor Yacht Club where they will remain over night. On June 27 the run will be from the Indian Harbor Yacht Club to the Huntington Yacht Club, and on the following day from Huntington to the Black Rock Yacht Club at Bridgeport,

Conn. On June 29 the fleet will proceed from the Black Rock Yacht Club to the Stamford Yacht Club and on the following day from Stamford to the Manhasset Bay Yacht Club, where it will disband. However, on July 1 it is probable that the majority of the boats will proceed to New Rochelle for the annual regatta of the New Rochelle Yacht Club. On July 3 the annual regatta of the American Yacht Club will be held which will be followed on July 4 by the annual regatta of the Larchmont Yacht Club.

In the daily run from port to port there will be races for all classes of motor and sail yachts, the details of the motor boat racing being in the hands of a committee of motor boatmen from the Long Island Sound Power Boat Association, and the sailing races being arranged by the committee of the yacht clubs which will act as hosts. The host clubs at whose anchorage the fleet remains over night will entertain and the probabilities are that the largest number of motor and sail yachts ever assembled together anywhere will take part in the daily runs from port to port. The whole idea of the scheme is one of an enjoyable cruise, rather than strictly a racing event. The schedule calls for very easy daily runs, the longest run of the week being hardly more than 25 miles.

Motor boatmen on Long Island Sound should realize the opportunity which this cruise will offer them, and as many as possible should plan to participate. This is the first time that the sailing interests have recognized the motor boatmen on the sound, and the success or failure of the event depends largely upon the motor boatmen themselves. The cruise also presents an opportunity for the motor boatmen to demonstrate to the wind-jammers that they are not such a bad lot after all, and are perfectly willing and able to give a good account of themselves on the water if they are given the chance.

Racing Schedule of the Barnegat Bay Yacht Racing Association

July 1—Try Out Sneak Boxes (men).
July 4—Open Sneak Boxes (men).
July 4—Girls' Point Sneak Box Race. Men's First Point Sneak Box Race.
July 15 Morgan Cup Race (catboats). Open Sneak Boxes (men).
July 22—Fleet Runs of Barnegat Bay Clubs to Atlantic City and Chelsea.
July 29—Men's Second Point Race Sneak Boxes.
Aug. 5—Schermerhorn Cup Race. (Sloops, Ocean City and Island Heights). Open Sneak Boxes (men).
Aug. 12—Sewell Cup Race (catboats). Open Sneak Box Race (men). A. P. B. sanctioned races, championship. Barnegat Bay—Hydroplanes, Express Cruisers, Cruisers, Displacement Racers, etc.
Aug. 19—Girls' Point Sneak Box Race. Men's Third Point Race, Sneak Boxes.
Aug. 26—Girls' Point Sneak Box Race. Men's Fourth Point Race, Sneak Boxes.
Sept. 2—Girls' Point Sneak Box Race. (Men's First Point Race, Sneak Boxes. (These races over Mantoloking course).
Sept. 4—Open Sneak Boxes (men).

Power Squadrons Under Fire

It has been called to our attention from numerous sources that in a recent issue of one of our worthy contemporaries, there appeared an article in which there were a number of misleading statements in regard to the true status of the Power Squadrons which we believe shows either utter ignorance on the part of the writer of the article in question as to the real condition of motor boating in this country at the present time, or else a desire to mislead the public in regard to the true intent and purpose of the Power Squadrons which are now doing such fine work throughout the country and are accomplishing real results.

It appears that the writer of the article referred to desires to imply at least that the Power Squadrons are a tool of the United States Government, being used by the latter to foster government legislation of an oppressive nature to the motor boatmen at large. This statement is far from the truth, as we believe the writer really knows. The article also reads: "Government officers first advanced the proposition publicly at a meeting of the governing board of the United States Power Squadrons in New York last March and the board supported the movement." Such a statement is not true, as the proposition was not advanced at any meeting of the governing board of the squadrons, and they have never voted on, considered, or agreed to support the proposition in any way. Furthermore, the article seems to desire to make the public believe that at the recent conference in Washington where the proposed legislation was discussed that the squadrons were represented by officers who spoke in favor of the legislation and promised their support. This again is very misleading and very far from the true facts, as the United States Power Squadrons have never officially taken any action of this nature or gone on record as favoring any legislation which would be oppressive to the motor boatmen.

It was not for the reason the writer of the article could not obtain the true facts from the Power Squadrons that he has chosen to attack them, not only in this instance but in several others, for one of his own editorial staff was commander of the First Great Lakes Power Squadron last year, and is at the present time actively engaged in Power Squadron work at Detroit, Mich. It is hard for us to see why a person who apparently knows so little about motor boating affairs should attempt to become godfather or advisor of the squadrons, whose membership is made up of the most able motor boating talent in this country.

(Continued on page 48)

New Things For MOTOR Boatmen

Thompson Detachable Motor Boats

The Thompson Bros. Boat Mfg. Co., of Peashtigo, Wis., is building two types of square-sterned rowboats for use with an outboard motor. Of these the standard model is made in 15- and 17-foot lengths, and is designed for all-around use on lakes and rivers where many varying conditions are encountered. The Standard model has a large carrying capacity and great stability and is very buoyant, riding over large waves instead of cutting through them. The 15-foot length will seat seven adults in comfort and the larger size is designed to seat nine persons. The draft when fully loaded is not more than six inches. The Lake model which is shown in our illustration is designed especially for use on the Great Lakes and other large inland bodies of water that become rough at times. This model is particularly seaworthy and it is said will stay perfectly dry in a sea that would swamp an ordinary rowboat. Both models are built of the finest material with frames of selected white oak and planking of clear cedar. All the fastenings are of copper and brass.

G-E Mercury Arc Rectifier

This is an inexpensive rectifier for use in club and private bathhouses in charging small starting, lighting and ignition storage batteries. It delivers about 5 amperes at a maximum of 15 volts when connected to the ordinary lamp socket, and it may be used with one three-cell, one six-cell, and two three-cell batteries as required. Form K rectifier, as illustrated, consists of a metal base on which are mounted the necessary reactance coils and rectifier tube in a suitable holder, the whole being covered with sheet metal. It can be furnished for 133-, 60-, 50-, 40-, 30- or 25-cycle, 110-volt circuits, the total weight of the 60-cycle rectifier being approximately 15 pounds. The manufacturer, the General Electric Co., Schenectady, N. Y., states that the process of charging a battery by this rectifier is extremely simple, and that the cost is very small, being not over fifteen cents for a ten-hour charge of a 12-volt six-cell battery.

Speedway Alcohol Ranges

The Gas Engine & Power Co., and Chas. L. Seabury & Co., Cons., of Morris Heights, N. Y., have improved their line of alcohol yacht ranges by the addition of a safety device for which patents are pending which is stated absolutely to eliminate the danger of explosion. In these safety ranges the alcohol cannot overflow in case the valves are carelessly left open, or a gust of wind blows out the flame, as in such cases the alcohol is led to an auxiliary tank beneath the range where it is as safe as if it were in the fuel tank. There is also no waste, as this auxiliary tank may be drained and its contents poured into the main tank for re-use. In their recent announcement the manufacturers also state that even if part of the stove is lighted and the rest left unlighted with valves open, it is impossible to cause the alcohol passing through the open and unlighted burners to catch fire and carry the flame to the tank and explode it. Other features of the new stove include a burner construction which is easily repaired in case of necessity, and a saving in fuel consumption from twenty-five to forty per cent. The Speedway range shown in the accompanying illustration is the No. 2 Special, with plate warmer, water heater, oven and broiler.

The Eells Anchor

Everybody who has ever pulled on an anchor rope has wished that something could be done to reduce the weight of the hook without destroying its holding power. The new Eells anchor, now being marketed by C. D. Durkee & Co., of 2 South St., New York City, seems to fill the bill, for we have it from the Durkee people that it will withstand double the strain, pound for pound, of any other anchor. It is also declared that the Eells will hold on any bottom, and will turn itself so thoroughly and promptly that it is almost impossible for it to foul. It is made in sizes from five pounds to ten tons weight, and sells, pound for pound, at the same price as other anchors. Its construction will be understood from the accompanying illustration.

Cummins Flanged Shaft Couplings

In addition to the Cummins Universal stuffing box, which has been described in these columns, C. L. Cummins, of Columbus, Ind., is manufacturing a line of flanged shaft couplings like the one shown in the illustration. These couplings are made of a good grade of gray iron, are accurately bored and faced, and have standard keyways and set screws. They are carried in stock in the following sizes and prices: $\frac{3}{4}$ - and $\frac{1}{2}$ -inch, \$1.50; $\frac{3}{4}$ - and 1-inch, \$1.75; 1 $\frac{1}{2}$ - and 2-inch, \$2. Larger sizes are sold at proportionate rates, and special bores or keyways may be had at an extra charge of twenty-five cents each.

Oil-Grooved Piston Rings

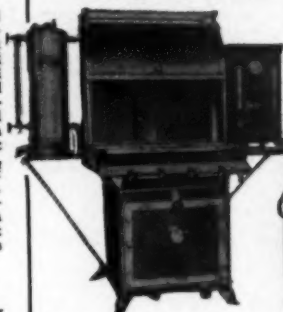
The Rittenhouse Machine Co., of 316 Holliday St., Baltimore, Md., is now manufacturing Oil-Grooved piston rings which are declared to have numerous advantages over other piston rings, the chief feature being the oil grooves which permit lubrication of the cylinder wall. Each ring is cut with two V-shaped grooves which are designed to catch the oil and impose a continuous film of lubricant between the two bearing surfaces. Another feature of this ring is the step lap joint which is declared to prevent the passage of gases into the crankcase or oil into the combustion chamber for as long as the ring is in use. Oil-Grooved rings are of the one-piece eccentric type and are made of the finest materials for all sizes of marine motors.



Thompson square-stern rowboat for outboard motors



G. E. mercury arc rectifier



Speedway No. 2 Special alcohol range No. 21 Dixie magnetos



Tillertite quadrant



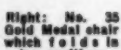
Cummins flanged coupling



The new Eells anchor



Left: Oil-grooved piston rings in place on a piston



Right: No. 35 Gold Medal chair which folds in two positions



A four-bow Masten top, with easy entrance device

Gold Medal Furniture

The Gold Medal Camp Furniture Mfg. Co., of Racine, Wis., makes a line of furniture of all types for use in camps and on motor boats. One of this concern's most popular folding chairs is that shown in the accompanying illustration (No. 35). This chair has two folds, making it convenient for packing or for stowing away aboard ship. It is made from selected hardwood with very heavy No. 4 drab duck seat and back, or if desired it may be had with white duck. The cost is \$2.75, or this chair may be had in golden or weathered oak for \$3.40. Another comfortable folding chair is the No. 3 which is adjustable to practically any position which the occupant may desire to assume. This chair may be folded and carried like an umbrella and is priced at \$1.66.

Nu-Rex Fire Killer

This is a fire extinguisher manufactured by the Bargar Mfg. Co., of Columbus, O., which is declared to kill fire in gasoline, oils, carbide, celluloid, cotton and fabrics without damage to anything but the fire. It is further stated that it will break electric arcs and extinguish electric fires without danger to the user or damage to the electric machinery. The Nu-Rex fire killer does not work like a pump, but throws a steady stream as soon as the valve at the base is opened. This stream, it is said, is over 35 feet long and can be cut off and on at will. A feature of the Nu-Rex is a gauge which shows the liquid contained and the amount of pressure at a glance. The liquid is stated not to deteriorate or freeze, but to be good until used. The design is such that the container may be readily filled after being used.

Rustol

This is a preparation brought out by the Oil Products Co., of 791 Broadway, Brooklyn, N. Y., for the purpose of loosening nuts, bolts, keys or other iron fittings which have become rusted in place. It may also be used to remove all dirt or grease from varnished surfaces, and as it contains no acid, is declared to be absolutely non-injurious to metal. For removing nuts, pulleys or any tight fittings a few drops of Rustol are squirted on the joint or thread to be loosened, and it is said that in less than a minute the most stubborn part will yield to the application of pressure of a wrench or similar tool. This preparation, which is handy to have aboard a boat or in a machine shop, is sold in half-pint, thirty-cent cans, and in larger sizes.

Dixie Outboard Motor Magnetos

The Sumter Electrical Co., 1466 Michigan Ave., Chicago, Ill., is supplying the trade with several models of small Dixie magnetos, suitable for outboard motors and the smaller inboard machines. Dixie Model 1 is a reversible magneto for single-cylinder ignition—that is, it may be fitted with a reversing coupling for operation in either direction. This magneto is used satisfactorily on single-cylinder engines with a bore as large as 3 $\frac{1}{2}$ inches and a stroke of 4 inches. Another model, No. 11, is similar to No. 1, but has the advance and retarding feature, and may be used in either direction. Model 21, shown in the accompanying illustration, is the same as No. 11 in the essential features, but is intended for two-cylinder ignition. It runs, however, in but one direction.

Tillertite Quadrant

The Tillertite Quadrant Co., of Northampton, Mass., is manufacturing a new quadrant known as the Tillertite, which is claimed to have at least one invaluable feature. This quadrant is similar in most respects to the ordinary quadrant, but it is provided with a winding drum whereby slack may be taken up in the tiller line with the least inconvenience. This, therefore, permits having the line tight at all times without the additional equipment of a turnbuckle. The Tillertite is at present offered in a ten-inch size, suitable for boats up to 30 feet length, and a larger size will shortly be introduced. It is constructed in galvanized iron or in bronze.

G. H. Masten Tops

The G. H. Masten Co., Inc., of 226 East 46th St., New York City, has inaugurated a marine supplies department, and is prepared to supply motor boatmen with auto boat tops, spray hoods, boat cushions, etc. In general, G. H. Masten tops are constructed with bows of white oak highly polished, bow fixtures and fittings of heavy polished brass, detachable curtains well lighted with celluloid, and tops that are held in position with guy ropes working through brass automatic clutches. The type shown in the accompanying illustration is a four-bow top with an entering device at the stern. The cover and spray shield are made of 10-oz. U. S. standard khaki, and the curtains are included in the price, which varies from ninety to eighty cents a square foot, according to the amount of material required.

Lewis Valves

The Lewis Electric Welding & Mfg. Co., of Toledo, O., makes a very complete line of valves for use in marine engines. These valves are of all sizes and types, and may be had with heads of 3 $\frac{1}{2}$ per cent. nickel steel, 30 to 35 per cent. nickel steel, and gray iron, etc., and all of them are welded to low carbon stems. In addition to valves the company also manufactures valve cages, according to the customer's specifications.



A view of the assembly floor of the addition to the factory of the Van Blerck Motor Co., of Monroe, Mich. Here production is going at a rate unprecedented in the history of the company, two eights a day in addition to the smaller models being turned out

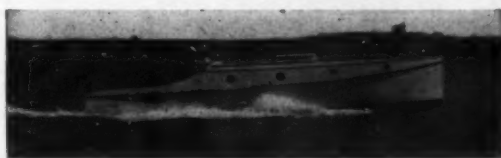
A Perfected Pioneer

Quite a bit over a year ago the Sterling Engine Co., of Buffalo, N. Y., brought out its first Model F—the eight-cylinder machine which has a bore and stroke of 6 1/4 x 9 inches and which develops 300 h.p. at 1,000 r.p.m. The demand for this powerful high-speed motor was there and the introduction of the motor created a still more urgent demand, for it made possible the combination of large motor yachts with high speed. Having its beginnings coincident with the introduction of the modern express cruiser, it is small wonder that the Model F is to-day being placed so generally in the new speed cruisers which private yachtsmen are building along lines suitable for scout and patrol service in time of war. No longer does the yachtsman need to stroll along at 10 knots; no longer does he have to try speeding up heavy-duty machines with the certain result of excessive vibration, high fuel consumption and short life of the motor. While the Model F 300 h.p. Sterling when first turned out was remarkably free from the inevitable minor crudities of a pioneer type, a year's careful study of the motor both by repeated and exhaustive tests on the block and by its operation in various craft under many different conditions, has enabled the manufacturers to make certain refinements and improvements utterly impossible in a new motor. One of these has been the introduction of the hollow crankshaft force feed oiling system, which in conjunction with the modified splash system gives practical perfection. This system of oiling combined with the extremely large bearing surfaces of this motor is declared to have put an end to bearing troubles which are so prevalent among high-speed engines. Other refinements have been made, each of which contributes its individual factor to the perfection of this motor. The experience gained by a year's study has permitted better carburetor adjustment, slightly more efficient water circulation, and so on. Trivial as the alterations may appear, they have, when taken together, made the Model F Sterling of to-day a better motor than the one of yesterday. But the one of yesterday has made this possible.

the announcement that the Loew-Victor Engine Co., of Chicago, Ill., has made arrangements with Morris M. Whitaker, who has tested a great many high-speed engines for foreign governments to test every Duesenberg motor which the above company builds. This means that every buyer of one of these machines will be supplied with a certified card showing the horsepower developed as well



A Matthews boat sold ten years ago to L. Laigety, a Russian business man at Soochow, China. This little fishing boat affords a marked contrast to the Chinese boats in the background



Cascade, a 38 x 5-foot cruiser powered with a 25-30 h.p. Buffalo. Turning a Hyde wheel 1,100 r.p.m., a speed of 14.6 knots is attained

about a month. Most of the finished and partly finished motors in evidence on the floor of the assembly room are the eight-cylinder 6 x 6-inch 300 h.p. Van Blerck, forty-seven of which are on order for domestic use and thirty-four for the Russian government. It is stated that in addition to the regular output of four- and six-cylinder motors, two complete eight-cylinder machines a day are being turned out six days in the week. In spite of the huge volume of orders placed with the company, it is declared to be right up to delivery promises, for the firm had the foresight last year to place orders for over a million dollars' worth of material and this material is now on hand. Standardization on size and type of motor also materially assists the turning out of large numbers of completed engines, as each man works at one particular job and thoroughly masters it.

Racine Factory Unusually Busy

Out in Racine, Wis., the Racine Boat Co. is working overtime to keep up with its orders for runabouts, day cruisers, speed boats and other motor craft for which this concern is so well and so favorably known. Sales for 1916 have so far run over 100 per cent. ahead of other years and orders for Racine's canoes and rowboats have almost shared the honors with those of more pretentious craft. Among the motor boats sold are a 35-foot coast guard runabout with a 55 h.p. Sterling, a 32-foot day cruiser with a 35 h.p. Peerless, a 31-foot seagoing cruiser with an E-4 Van Blerck, a 35-foot tug boat with a 20 h.p. Peerless, two 25-foot Raco runabouts, a 23-foot express runabout, three 19-footers, an 18-foot shallow draft boat, and smaller boats in large numbers. In addition to these, carload shipments of boats have been sent to John Wanamaker, of New York; the Seminole Hotel Co., of Winter Park, Fla.; and C. L. Brandeis & Sons, of Omaha, Neb.

Shooting Giscombe Rapids

Frederick Foster, northwestern pioneer and social, civil and industrial investigator for the Grand Trunk Pacific Railway, has before this proved his ability to take the knocked-down material for a No. 26 semi-V-bottom runabout, manufactured by the Brooks Mfg. Co., of Saginaw, Mich., and build a good boat, but this we understand is a thing which any amateur can do. As a descriptive writer, however, Mr. Foster has some of the professionals lashed to the mast. It seems that he had been up the Fraser River in Canada to the head of navigation and desired to shoot the eleven-mile stretch of boiling water known as the Giscombe Rapids, on his return trip. He had been over the ground—if you can call it that—many times before, but this was his first experience in his Brooks runabout. Gracefully we yield the floor and let him tell about it: "We pushed out to mid-stream and then, full speed ahead, the Brooks that I built during spare moments poked its nose into as treacherous a piece of navigable water as can be found in North

Changes in the McQuay-Norris Organization

Several transferences have recently been effected in the selling force of the McQuay-Norris Mfg. Co., of St. Louis, Mo. One of these concerns H. W. Knapp, who for some months has been the Denver branch manager and who now becomes manager of the branch located at Kansas City. Another affects H. W. Sweeney, who has been traveling through the middle west selling Leak-Proof rings and has now been shifted to Denver to fill Mr. Knapp's place. C. H. Eckhard is a third member of the force who has felt the effect of the shifting process.

Some Important Loew-Victor News

Of particular interest to the purchasers of high-grade marine engines is

as the fuel economy, and signed by Mr. Whitaker. It has also been stated that the Duesenberg engines contracted for by many prominent yachtsmen are now being assembled, while thirty of them were shipped at about the middle of April. The fact that the Loew-Victor Co. is controlled by men interested in some of the country's largest industrial corporations, permitting them to secure supplies with little trouble, makes it possible for this concern to guarantee prompt deliveries. A recent Duesenberg buyer is L. L. Driggs, who purchased the Swasey-designed cruiser Ensign from Irving E. Raymond. Mr. Driggs is replacing her former motor with a six-cylinder 200 h.p. Duesenberg and expects a speed of 18 m.p.h.

Splitdorf Opens Oakland Branch

We take pleasure in announcing that the Splitdorf Electrical Co., of Newark, N. J., has opened a branch and service station at 340 Broadway, Oakland, Cal. Here users and prospective owners of Splitdorf magnetos, Splitdorf-Apelco starting systems and other equipment manufactured by this concern will receive the most careful and courteous attention.

Van Blerck Busy-ness

The heading photograph this month gives an idea of the interior of the new Van Blerck factory at Monroe, Mich., after it had been in service for



O. C. Kreis, chief engineer of the Gray Motor Co.



H. N. Leonard, new vice-president and general manager of the Ferro Machine & Foundry Co.

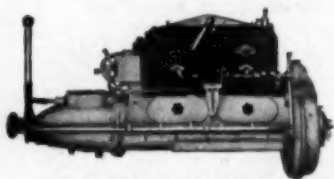


A big four-cylinder 100 h.p. Anderson motor, used to turn a heavy pontoon drawbridge in Chicago

America. My memory of the channel came near failing me once, but happily we only scraped the rock which surely would have 'spilled us in the drink' had we hit it fairly. No half hour I have ever spent in a motor boat was so crowded with tense situations, and it was with a breath of relief that we rounded the last rock-studded turn and shot into the quiet water beyond. Ours was probably the first motor boat that had ever been through Giscombe, and of many that have followed only a few have escaped some sort of disaster. If my faith in the staunchness of a Brooks had ever faltered, it would have been quickly restored by this experience."

The New Prest-O-Lite Battery Plant

The large addition to the main factory of the Prest-O-Lite Co., Inc., of Indianapolis, Ind., to accommodate the increased production of Prest-O-Lite storage batteries is practically completed. The new building, 200 feet long by 100 feet wide, is the second largest of the present factory group. It has excellent facilities for a large output and when ready for operation a production of 1,200 batteries a day will be possible. The present output of Prest-



The Scripps with which Piute III models are now being powered

O-Lite batteries is stated to be 400 a day. Plenty of provision for ultimate expansion has also been made. The building in general is one story in height with a monitor roof. There are, however, two rooms on the second floor, of which one will be used as a welfare room and the other for shop offices and laboratory. The construction throughout is reinforced concrete.

Bilma, a Great Lakes Cruiser

The cruiser shown in one of the accompanying illustrations is Bilma, owned by W. G. Selby, of Marietta, O., and now cruising out of Tampa, Fla. This boat has recently been developed as a standardized stock model by the Great Lakes Boat Bldg. Corp., of Milwaukee, Wis., and it is stated to represent about the last word in small high-speed cruiser design and construction. It is not only fast, but very seaworthy, dry and comfortable and extremely easy of manipulation. The boat is entirely controllable by one man at the steering column on the port side forward of the cockpit. Powered with a 50-60 h.p. motor, a speed of 19 m.p.h. is attained.

Anderson in Bridge Service

One of the photographs on this page shows a 100 h.p. four-cylinder 9 1/4 x 11-inch Anderson marine motor operating a large pontoon float bridge at Torrence Ave., Chicago. This bridge is stated to be the largest of its type in existence, the draw

itself being 120 feet long and 26 feet wide. One end of this draw pivots and the other rests on a heavy steel pontoon. The total weight of the swinging portion of the bridge is 200 tons, and the length of movement or swing of the pontoon is 125 feet, which distance is usually covered in about sixty seconds. A continual movement at this rate would average only a little over a mile per hour, and if this outfit could, therefore, be classed with motor boats, it would be the slowest one in the world. The pontoon is propelled by two standard propeller wheels, one at each end, which are attached to the same shaft and connected to the engine by means of a large silent chain. The engine in addition to running these propellers operates an air compressor for the self-starter and a centrifugal pump for pumping out and raising the pontoon each time the bridge is to be opened. A Joe's reverse gear is used.

Hand V-Bottom Boats

The Piute III model, originated several years ago by Wm. H. Hand, Jr., of New Bedford, Mass., continues to be as popular as ever. On account of its adaptability to all kinds of uses and its seaworthiness, many boatmen have cast aside all ideas of new designs and have concluded that "old friends are best." Mr. Hand is now specifying the Scripps four-cylinder 4 1/2 x 5-inch all-enclosed model as standard equipment. Among New Yorkers now building these popular boats are F. J. Baldes, B. F. Rodman and Geo. P. P. Bonnell. Mr. Bonnell's boat, which will be known as Old Glory III, is scheduled to make the trip from New York to Digby and return some time during June next in an effort to lower the record for the distance established by Mr. Bonnell in Old Glory II in 1912.

Deering Hydroplane for Rowboat Motors

Although originally designed for rowboats, the outboard motor has shown its ability to propel successfully craft of a more advanced type, and August Deering, of the Deering Boat Mfg. Co., of Madison, Wis., has come forward with a real hydroplane built especially for use with this type of motor. Designed for speed, this hydroplane is also essentially safe, and it is said that three men can sit on the top of one side with the gunwale still clearing the water by three inches. While perhaps men would not care to sit on the gunwale, this factor of safety means that one can carelessly walk around in the boat, cast, shoot or dive from the deck with no fear of capsizing. Also because of this feature and because of the protection given by the decks and coaming the boat will stand a fairly rough sea. Another big advantage claimed for this craft lies in the elimination of vibration, effected by the strong reinforced deck beams fore and aft and the solid stern transom. The hydroplane weighs only about 200 pounds and yet it will accommodate seven persons in comfort.

Bull Dog, the Silent Partner

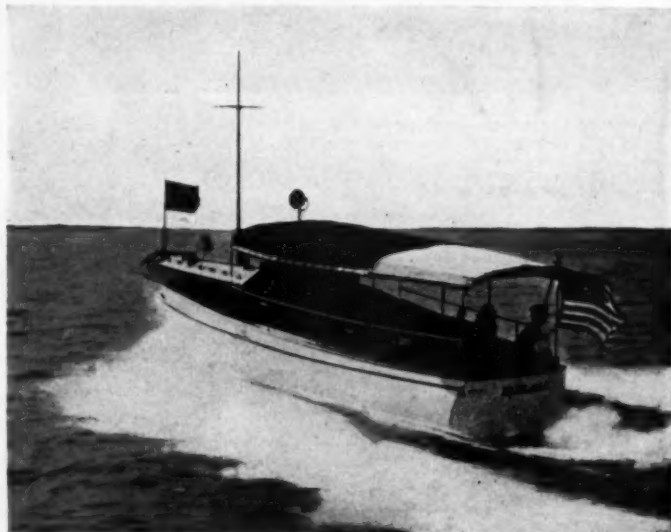
The Kennedy Machine Co., of 45 Fort St., East, Detroit, Mich., has received a testimonial letter from Geo. S. Riley, of Aspinwall, Pa., which speaks volumes for the worth of this concern's Bull Dog reverse gear. Part of the letter follows: "I certainly take great pleasure in recommending my silent partner, the Bull Dog reverse gear. He is my most faithful companion. I never know that he is there until I need him, and then he is to the motor boat what the Westinghouse air brake is to the passenger train, and he truly 'never fails to grip' and hold. Three seasons' work and not one cent for repairs. Your own records will verify the fact that I have never ordered a repair part for a Model A gear. During demonstrations I have done my best to smash it, but only succeeded in cutting out a key seat on the engine and the Bull Dog never even got warm."

Buffalo Agents for China

Melchior, Armstrong & Dessau, New York, who for some time have acted as distributors for the Buffalo Gasoline Motor Co., of Buffalo, N. Y., in a number of European countries, have just been given the agency for Buffalo engines in China. They have appointed as their sub-agents the firm of Anderson, Meyer & Co., who have branches in Hankow, Hong Kong, Peking and Tientsin.

A Motor Whaling Boat

One of the most interesting orders entered by the Van Blerck Motor Co., of Monroe, Mich., in the more recent past is that for a six-cylinder 100 h.p. motor to be shipped to Picton, New Zealand, for installation in a 34 x 7-foot 6-inch V-bottom type of boat designed by Collings & Bell, of Auckland, N. Z., for the Whaling Company at Picton. This boat will be used for chasing and harpooning whales and must be capable of at least 28 m.p.h. It is



Bilma, a standardized stock model, built by the Great Lakes Boat Building Corp. of Milwaukee. This boat is owned by W. G. Selby, of Marietta, O., and is used out of Tampa, Fla.

being strongly built on the diagonal principle and will carry three-quarters of a ton of lines and gear, with a harpoon gun mounted in the bow. The boat will have to go out in all weathers and work many hours at a stretch. That a high-speed motor of American make has been selected is extremely interesting and shows how popular this type of motor is becoming not only in this country, but all over the world. The Van Blerck Motor Co. has long realized the importance of cultivating the export field in view of the many opportunities offered, and as a result of the work put in along these lines, is in a position to state that fully 20 per cent. of its total orders booked at this date are for export, exclusive of so-called war orders.

Schubert Now with Mott Iron Works

We have been asked to announce that Wm. Schubert, who for more than sixteen years was connected with the A. B. Sands & Son Co., has changed his position and is now in the marine department of the J. L. Mott Iron Wks., of 118 Fifth Ave., New York City. He will there endeavor to serve all those desiring his assistance or quotations on marine sanitary fixtures and specialties for the motor boat, steam yacht, or largest steamship.

A Satisfied User

Valentine & Co., of 436 Fourth Ave., New York City, have received the following letter from O. P. Boettger, of Baltimore, Md. It has the value among other things of proving that a satisfied customer is a good friend. The letter follows: "The reason I like Valspar and will keep on using it is that I have had the most convincing proof of its worth. This past summer Baltimore was visited by a most damaging storm. Over two-thirds of the fleet were either swamped or broke from their moorings. Fortunately mine was only swamped;



One of the famous Piute III V-bottom runabouts designed and built by Wm. H. Hand, Jr., of New Bedford, Mass. They are now being equipped with the Series B-4 Scripps motors



Pegasus, a great big 28-footer, designed by John L. Hacker, of the Albany Boat Corp. She is owned by F. M. Sibley, of Detroit, who gets a speed of 33 m.p.h. out of her

my boat was at the bottom of the river for three days before being raised, and the only 'revarnishing' I did was with luke warm water to wash the mud off. It was absolutely unnecessary to revarnish, as the soaking in salt water had no more effect on the Valspar than a light shower, which was none. A varnish which will live through such an extreme experience and come out bright and unharmed seems surely to offer double insurance of complete satisfaction under ordinary circumstances.

Recent Anderson Installations

It has just been announced that the 65 x 13-foot Yarrow, of Chicago, will be faster than ever this coming season, as her owner, G. W. Robinson, has just ordered two four-cylinder 7 x 8½-inch Anderson motors for installation within two or three weeks. Another four-cylinder Anderson has been ordered for Sam Poulsen, of Elliott, Ill., to equip a 36-foot passenger boat which he is now building. This motor is a 24 h.p. affair with cylinders measuring 5 x 6 inches.

A 53-Foot Scout Boat

It is declared that at least one of the fleet of scout cruisers being built from designs by Swasey, Raymond & Page, and resembling the famous Houpla, will be powered with a pair of eight-cylinder 6 x 6-inch Van Blerck motors each developing 225 h.p. The boat in which these motors will be installed is now under construction at City Island and will be delivered to her owner, a member of the New York Yacht Club, on July 1. A speed of 30 real miles per hour is expected.

Sterling to the Rescue

During a terrific storm in February the five-masted schooner Margaret Haskell, bound from Pensacola, Fla., to Genoa, Italy, foundered off Hole in the Wall Passage, Bahama Islands, and her captain, James A. Loesch, the mate and the crew of eleven men found it necessary to take to the 26-foot yawl. Luckily this yawl was powered with a 10 h.p. heavy-duty Sterling and so the story has a happy ending. It is declared that under exceptionally severe conditions and with water breaking over the engine almost continuously it ran



Evelyn, a 26-foot knock-down boat, used by S. L. Wilgus, of Bellefontaine, O., on Indian Lake. The knocked-down parts of this boat were furnished by the Pioneer Boat & Pattern Co.

steadily from 6:30 in the morning until midnight when the fuel was exhausted. Three days later the party was picked up by a United Fruit Company's steamer and carried to Boston, but it is really to the reliability of the Sterling motor that the men owe their lives. Such an occurrence is cause for elation all around.

G. H. Masten Co. Opens Marine Department

The G. H. Masten Co., Inc., of 222-226 East Forty-sixth St., has recently added to its other departments a marine supplies department which will specialize in things on boat tops, spray hoods, seats and cushions. This company has been in existence for many years and is said to be doing a very large and prosperous business.

News from Florida

Florida is not only almost entirely surrounded by water, but in its central portion is very largely covered by it, there being in the Lake district more ponds and lakes than you'd care to fall into in a day's walk. From the center of this section, Mr. Dora, comes the report that the J. E. Dingee Boat Works is enjoying a most successful season, building hulls of all kinds. One boat which the president of the company, Mr. Dingee, writes us is sure to be a world beater, is a 16-foot flat bottom monoplane with 49-inch beam, very blunt forward and having ¼-inch planking over an oak frame and pine battens. The hull alone weighs 300 pounds and is equipped with a 15 h.p. Pierce-Budd two-cylinder two-cycle motor which with reverse gear weighs 200 pounds. With two passengers aboard this little outfit has made 23¼ m.p.h. over a measured mile.

Disbrow Handles Joe's Gears

Snow & Petrelli announce that they have appointed W. C. Disbrow, Jr., 71 Cortlandt St., New York, distributor of their reverse gears for New York territory. Mr. Disbrow is well known to all motor boat enthusiasts. He has been in the marine engine business for many years, and is especially well prepared to handle this business in an efficient manner. Mr. Disbrow will carry a line of Joe's gears and repair parts in stock at New York.

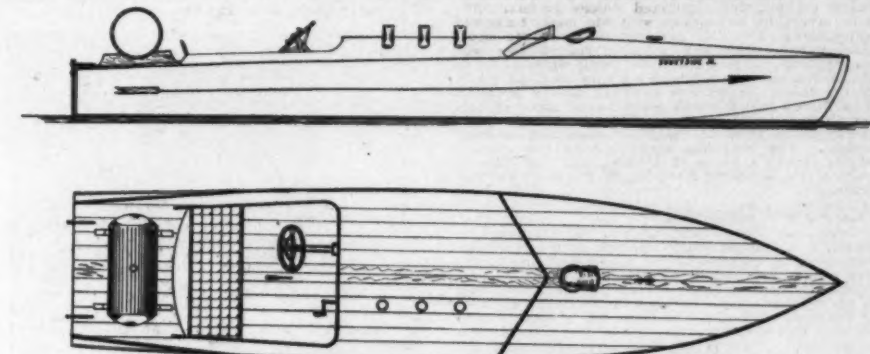
Curtiss Aeroplane Co. Makes Offer

A course of training to an officer of the militia

which has volunteered to train the officers on either land or water aeroplanes at any of the following points at which Curtiss Aviation Schools are located: Buffalo, N. Y.; Hammondsport, N. Y.; Newport News, Va.; and San Diego, Cal.

National Association Affairs

At a meeting of the Executive Committee of the National Association of Engine & Boat Manufacturers, Inc., held in the Engineering Societies Building, 29 West Thirty-ninth St., New York City, re-



Lines of the unique hydroplane which Cliff S. Hadley, of Ozone Park, L. I., is building. She will be powered with a Roberts motor which will be virtually sealed under the deck for the entire season

cently, the following officers were re-elected for the ensuing year: President, John J. Amory, of the Gas Engine & Power Company and Chas. L. Seabury & Company, Cons., Morris Heights, New York City; first vice-president, Henry R. Sutphen, of The Elco Company, Bayonne, N. J.; second vice-president, P. C. Jones, of the S. M. Jones Company, Toledo, Ohio; third vice-president, Charles A. Crique, of the Sterling Engine Company, Buffalo, N. Y.; treasurer, James Craig, of the James Craig Engine & Machine Works, Jersey City, N. J.

Henry R. Sutphen, chairman of the Exhibition Committee, in an exhaustive report on the recent New York National Motor Boat Show at Grand Central Palace, stated that it was the most successful show in the history of these exhibitions. New record figures were established in points of attendance, space sold and actual sales made by exhibitors at the show. A refund of 50 per cent. had already been made to exhibiting members on the cost of space occupied, and at this meeting, making a total distribution of 75 per cent.

The Committee on Legislation, through its Chairman, Geo. F. Lawley, reported that a hearing had been requested before the Senate Committee on Commerce and the House Committee on the Merchant Marine and Fisheries, in Congress, now in charge of certain bills that have been referred to them affecting motor boats and their usage. These bills are considered

to be impracticable and detrimental to the interests of not only the industry, but also to motor boat owners all over the country, and the opposition to their passage should be very strong.

Famous Houseboat Changes Power Plant

One of the most famous motor houseboats afloat is Cocopomelo, designed and built for William Dieston, by the Mathis Yacht Building Co., of Camden, N. J., and the fore-runner of a good-sized fleet of houseboats of similar design since built by the same firm.

It is in Florida waters that Cocopomelo feels most at home, and there are few waters in the State that have not been visited by her. Her shallow draft permits her to navigate many channels

which are denied many smaller and deeper draft vessels. Jacksonville, the metropolis of Florida, is now the home port of Cocopomelo, and she is now the property of Benedict Crowell, of that city.

The present owner decided to change the power plant, and because of its great reliability and efficiency the powerful heavy-duty Sterling engine was selected, two four-cylinder 3½ x 4-inch heavy-duty Sterlings being installed. These motors develop 25 h.p. each at 400 r.p.m. and 33 h.p. at 500 r.p.m. They were installed under the efficient supervision of the National Boat & Engine Co., of Jacksonville, who are Florida distributors of the Sterling Engine Co.

Scripps Factory Working Overtime

Reports from Detroit are to the effect that sales of the Series B Scripps have taken such a decided trend upward this spring that the factory of the Scripps Motor Co. is working overtime. When the Series B Scripps motors first appeared at the New York and Chicago shows of 1915 they excited a great deal of comment throughout trade circles and 1916 designs show that the public evidently was impressed by the enclosure of the flywheel, the valves, reverse gear and even the wiring. So great has become the demand for the first all-enclosed motors, from both foreign and domestic sources,

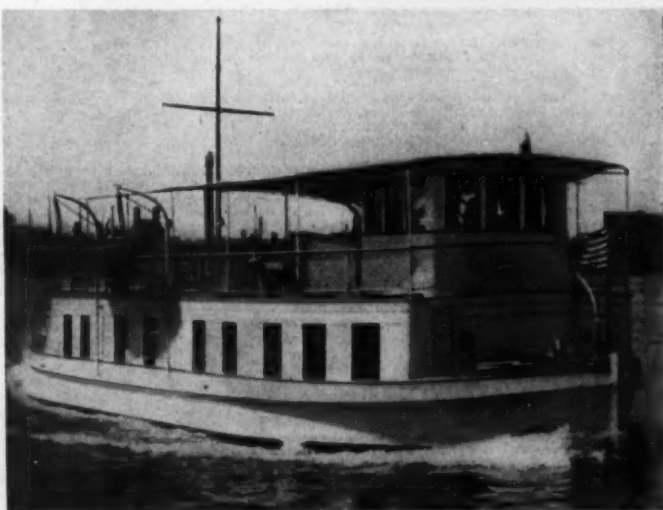
that without a single dollar's worth of war business on its books the Scripps factory has been kept working night and day for over two months in order to keep up with the avalanche of orders coming its way. Renewed activity on the part of the Pacific coast trade, as well as extraordinary demands from the eastern seaboard, have helped to make this possible.

A 17-Foot Hydroplane

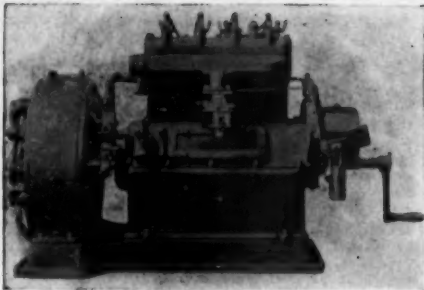
Cliff S. Hadley, of Ozone Park, L. I., has designed a 17 x 4-foot hydroplane, shown in the accompanying plans, which has several unusual features. Sannyside, Jr., as it is called, will be decked over from the bow to within five feet of the stern, a three-foot cockpit being separated from the wake by a short after deck upon which is mounted a gasoline tank. A 3-M Roberts marine motor will be installed and the boat will be decked over solid, so that it will be impossible to get at the engine without tearing off the decking. The grease cups will be mounted on the bulkhead and a pipe running to each bearing will supply them with grease. The exhaust stacks will come through the deck. The wiring from the magneto will run through tubing and will be soldered to the spark plugs so that there will be no chance of their becoming loose. The carburetor adjustment will be permanently established when the boat is launched in May, and the lubrication is attended to by mixing one quart of the best oil with every five gallons of gasoline. Mr. Hadley is designing his boat in this way, he says, merely to show the boys that when they get a good honest motor there is no fear of its stopping or refusing to start. He expects to enter every race run in his vicinity this summer.

Pegasus, a 28-Footer

One of the accompanying illustrations shows Pegasus, a 28-foot runabout designed and built



Cocopomelo, a famous houseboat designed by the Mathis people. Her owner has just installed two heavy-duty four-cylinder Sterlings



The 4 k.w. Universal lighting plant for boat lighting purposes

under the supervision of John L. Hacker for F. M. Sibley, of Detroit. This boat is considered large for her size, as she has a generous beam and rather more than the average freeboard. An exceptionally roomy cockpit, well appointed, makes the boat compare favorably in comfort with the most luxurious automobile. The hull construction is of the usual Hacker type with oak framing spaced two feet on centers and intermediate small frames every six inches, and secured with a steam-bent oak frame at the chine. Pegasus is equipped with a Model E Van Blerck motor which gives her a speed of better than 33 miles an hour. This is considered remarkable in view of the dimensions and unusual weight. The boat has been used in the vicinity of Mr. Sibley's home at Detroit, and has created quite a stir, defeating many larger and high-powered boats.

A 35-Foot Despatch

Down on Lake Pontchartrain, O. Marson, of Akers, La., logging superintendent of a large lumber company, uses his 35-foot motor boat day in and day out as a despatch carrier. In addition he performs the small trifle of towing logs on the average of 100 miles per day. Perhaps the fact that his boat is equipped with a 25 h.p. Ferro has a good deal to do with this performance. At any rate, Mr. Marson is satisfied. This is what he has written to the makers of the motor, the Ferro Machine & Foundry Co., of Cleveland, O.: "I have traveled 22,015 miles to date and have put on a new clutch, a set of piston rings, one part for the pump and a bar nut on the habbitt journal. In four years' time I have missed only one train and I want to tell you that the Ferro goes when the rest of them are tied up and that the rougher the weather the better the engine runs."

Ailsa Craigs on 38-Foot Sea Sled

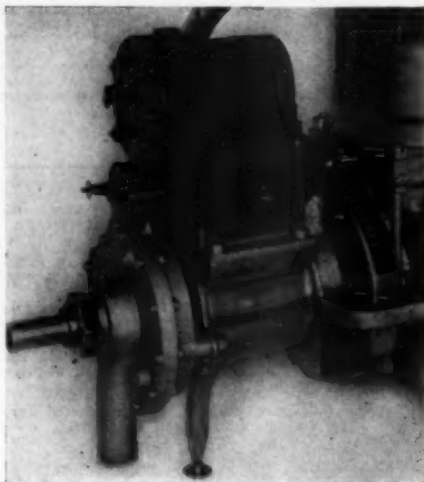
In our last issue we showed on page 31 a striking photograph of the business end of the new 38-foot Sea Sled, but neglected to give credit where it was due. While there are a good many boat owners who are familiar with the general characteristics of the Ailsa Craig propellers, we wish now to tell those who aren't that the 38-footer in question is fitted with a quadruple set of these efficient wheels. Not only may propellers from the Columbian Brass Foundry at Freeport, L. I.,

fully utilized for manufacturing purposes. The total floor area of the new plant will be 115,000 square feet or about two and three-quarter acres. The welfare and convenience of the employees have been carefully considered. To safeguard the contents of the building a sprinkler system is to be installed, and we understand that this is the first of several extensive improvements about to be made in the plant of the Splittorf company. This concern has long since outgrown its old quarters and the addition is necessary to enable it to care for increasing demands. The structure will probably be ready for occupancy by July 1.

Trade Literature Received

The Albany Boat Corporation, of Albany, N. Y., has recently issued a catalogue which, in the field of high class runabouts, express cruisers and fast tenders is a revelation. It is not only a handsome specimen of the printer's art, but contains a wealth of real information.

The 1916 catalogue of Evinrude motors produced by the Evinrude Motor Co., of Milwaukee, Wis., is typical of the high quality of engine literature produced by this concern. It is attractively printed and contains a great number of photographs of the Evinrude outboard motor in all parts of the world. The new models, including the inboard motors for



The magneto on Roberts motors is bolted to a bracket that oscillates around the end of the crankcase, retarding and advancing the spark in this manner. This unique method of magneto installation permits the armature to be rotated instead of the distributor, bringing the break always at the peak of the wave.

permanent installation, are described in detail and the subject of Evinrude outboard motor rowboats is also taken up.

We have just received from the Morton Motor Co., of Detroit, Mich., an attractive catalogue printed on India tint paper descriptive of the Morton marine motor. This catalogue is made doubly interesting by the inclusion of an illustrated story of the production of this 550 motor at the Morton Co.'s plant.

The Gas Engine & Power Co., and Chas. L. Seabury

& Co., Cons., of Morris Heights, N. Y., have sent us their 1916 announcement of Speedway products. This is an effective catalogue describing in detail the Speedway marine motors, and several of the stock boats built up at the Morris Heights plant and including also the designs of a number of large Speedway motor yachts and houseboats.

We have received from the Carlyle Johnson Machine Co., of Manchester, Conn., this company's Model F price list descriptive of its three ball bearing marine reverse gears which have been manufactured in the past, as well as a four-page leaflet listing the five sizes that are being placed on the market this season. Other new literature issued by this concern describes in detail the Bud-E marine motor which is made in 5 and 15 h.p. sizes.

An interesting catalogue has come to us from the Lamb Engine Co., of Clinton, Ia., manufacturer of ten different sizes of marine motors in two, four and six cylinders, in the Lamb and Lambkin types. The catalogue is descriptive of these motors and is illustrated by numerous illustrations of boats having Lamb installations. Two motors of particular interest are the 40 and 60 h.p. heavy-duty models which are fitted with new intake manifolds and water-jacketed exhausts.

We have received from the Bosch Magneto Co., of New York, a copy of the March issue of the Bosch News, distribution of which was delayed by the freight congestion. This is a house organ which will be mailed to anyone on request and which is always full of interesting news concern-

ing the Bosch products. One of the leading articles in the present issue is a history of the Bosch magneto.

The W. H. Mullins Co., of Salem, O., has recently sent us two interesting catalogues, one of which relates to Mullins cedar canvas-covered canoes, and the other to this company's standardized wooden boats. Both are handsomely printed with colored illustrations. A separate folder issued by this company describes the 16-foot Mullins steel hydroplane which is powered with a 25 h.p. motor and has a guaranteed speed of 28 m.p.h.

Edward Smith & Co., of Chicago, Ill., have sent us their annual list of winners of motor boats and sailing yacht races. This little volume is always of interest and value to yachtmen, the more so in that it contains a complete list of the marine paints and varnishes prepared by this concern.

We have received from the Clay Engine Co., of Cleveland, O., a catalogue of Clay four-cycle heavy-duty motors. This catalogue contains an explanation of the designing principles of Clay motors, technical descriptions of them and information concerning manufacturing methods.

An interesting folder issued by the Ferro Machine & Foundry Co., of Cleveland, O., relates to the design and construction of the new 10 h.p. Ferro motor. This motor which is described on another page of the present issue is part of a line of two-cycle and four-cycle motors for practically every type of service.

The new catalogue published by the Roberts Motor Mfg. Co., of Sandusky, O., contains a wealth of information regarding the "motors that never backfire." These motors are all of the two-cycle type and comprise a line ranging from a single-cylinder 4 h.p. model up to a twelve-cylinder V-type 350 h.p. racing motor. The Roberts people have also had unusual success with their aviation motors and a separate catalogue descriptive of them has been issued.

L. W. Ferdinand & Co., of Boston, Mass., get out a little folder telling of the various uses of Jeffery's marine glue and how to apply it. It contains a price list and other important information and will be mailed to any address on request.

The history of the National Coil Co., of Lansing, Mich., is the subject matter of an interesting folder brought out by this concern. Half-tones of the more important departments of the National factory are included and the work of each department is taken up in detail. The National Co. was organized in 1897 and its growth has been consistently rapid since that time, until now a large up-to-date plant is occupied where many thousands of coils and magnetos may be produced yearly.

Three interesting publications form the contribution of the Gray Motor Co., of Detroit, Mich., to the marine engine literature of 1916. The first of these is a catalogue of the many two- and four-cycle motors bearing the Gray name; the second, entitled the Gray Book of Boats, comprises over 200 testimonial letters from satisfied Gray owners together with illustrations of a large majority of the boats in which these Gray installations have been made; and the third is a boat builders' catalogue containing descriptions and illustrations of a large number of boats manufactured by various concerns which may be successfully powered with Gray motors. This is a co-operative scheme original with the Gray company which should prove of great value to the prospective purchaser of a boat or motor, as the list of boat builders incorporated in the booklet is very complete.

The Murray & Tregurtha Co., of South Boston, Mass., has sent us two sheets descriptive of two of the more popular Hickman Sea Sleds. One of these is of a 32-footer constructed for the Navy, and the other is the 38-footer powered with four 185 h.p. motors which has a speed of 45 m.p.h. and weighs 19,500 pounds.

The Gasth Motor Co., of Cleveland, O., has sent us a catalogue of Gasth heavy-duty marine motors which are made in two, three four and six cylinders. These motors have a bore and stroke of 6 1/2 x 8 inches and a power range for the various models from 12 to 54 h.p. They are of T-head design and are marked by such features as large water jackets, make and break ignition with Bosch low tension magneto, splash feed lubrication, etc.

The Simms Magneto Co., of East Orange, N. J., has recently issued a catalogue descriptive of the many types of Simms magnetos. The American Simms magneto is of the true high tension type in which the current is both generated and transformed in the rotating armature, without the introduction of any exterior devices. The various models in the line are described in detail and the catalogue also includes wiring diagrams.

The Sherwin-Williams Co., of Newark, N. J., gets out a color chart of the various paints which it prepares for motor boats and yachts. These include deck and canvas paints in five different colors, anti-fouling composition, boot-top paint, marine engine enamel, copper paint, aluminum finish, etc., etc. These paints are the result of years of experience and are declared to be of the finest quality.

(Continued on page 48)



The three attractive booklets which the Gray Motor Co., of Detroit, Mich., offers as its contribution to 1916 marine engine literature

be found in combination with Van Blerck motors, but also with Sterlings, Duesenbergs, Bridgeports and Fay & Bowens, as the manufacturers of these motors all buy Columbians as stock equipment.

The Universal Lighting Outfit

An interesting lighting outfit that makes a strong appeal to owners of large motor boats and yachts is manufactured by the Universal Motor Co., of Oshkosh, Wis. This generator set is particularly adapted to boat lighting and searchlight use, and one of its great advantages is its compactness. The Universal has a capacity of 4 k.w. and is said to furnish smooth, direct current regardless of the number of lights used, a governor of special construction insuring smooth operation at all times. The engine is a four-cylinder, four-cycle machine operating at 7-1,100 r.p.m. and consuming six pints of fuel per hour under full load. The equipment furnished is complete, although the switchboard can be eliminated in most cases.

Addition for Splittorf

What will, it is said, be one of the best lighted factory buildings in this part of the country is about to be erected for the Splittorf Electrical Co., of Newark, N. J. It will be a fireproof structure of reinforced concrete to cost approximately \$200,000 and will contain more than 30,000 square feet of window glass about its four sides. The buildings comprising the present plant will not be disturbed in any way, and will continue to be

Calendar

- June 17—Annual Race, New York to Albany and Return
- June 24—New York to Block Island
- July 3-5—Mississippi Valley Power Boat Association Regatta
- July 8—New York to Cornfield Lightship and Return
- July 15—New York to Ambrose Channel Lightship and Return
- July 27—New York and New England Race
- August 15-16-17—Races for Thousand Islands Championship Challenge Cup, Alexandria Bay
- September 2-4-5—Gold Cup Races at Detroit

MOTOR BOATING ADVERTISING INDEX

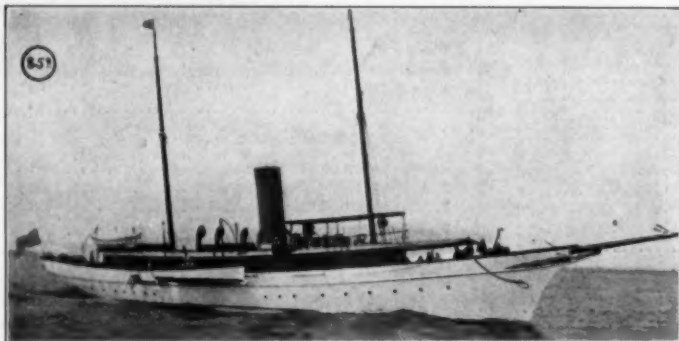
A		H		Pioneer Boat & Pattern Co.		50
Able Engine Co.	50	H. & N. Carburetor Co.	68	Powerlight	53	
Ackley Boat Bldg. Co.	52	Hall Co., W. S.	55	Prest-O-Lite Co.	83	
Aerohrust Eng. Co.	75	Hand, Jr., Wm. H.	48	Pyrene Mfg. Co.	89	
Albany Boat Co.	73	Hansen Nietzer Safety Co.	87	R		
Anderson Engine Co.	50	Hawthorne Mfg. Co.	50	Racine Boat Co. (Racine)	66	
Apple Electric Co., The.	70	Heinze Elec. Co.	52	Red Wing Motor Co.	82	
Arrow Motor Co.	51	Henricks Magneto & Elec. Co.	65	Regal Gasoline Engine Co.	58	
Automatic Machine Co., The.	73	Holospaer Cooperage Co.	54	Richardson Boat Co.	57	
B		Hyde Boat & Eng. Co.	60	Roberts Motor Mfg. Co., The.	64	
Baldridge Gear Company, The.	70	Hyde Windlass Co.	79	Robertson Bros.	58	
Barber, M. A.	50	I		Roper & Co., C. F.	55	
Binney, Arthur	48	Ingram Hatch Motor Corp.	56	S		
Boston Varnish Co.	80	J		S. R. Mfg. Co.	52	
Bowes & Mower	48	Jacobson Machine Co.	54	Sands & Sons Co., A. B.	92	
Bridgeport Motor Co.	50	Jennings Co., H. H.	45	Sanford, Harry W.	48	
Bridgeport Wood Finishing Co.	58	Johns-Manville Co., H. W.	84	Schmitz Bros.	50	
Brooks Mfg. Co.	80	Jones & La Borde Co.	58	Scripps Motor Co.	3rd Cover	
Bruns, Kimball & Co., Inc.	48	Jones, S. M. Co., The.	61	Seaman, Stanley M.	41	
Bryant & Berry Co.	71	K		Sears, Roebuck & Co.	57	
Buffalo Gasoline Motor Co.	1	Kennebec Canoe Co.	50	Sherman, E. M.	60	
Byrne, Kingston & Co.	78	Kennedy Machine Co.	53	Shaw Propeller Co.	64	
C		Kenyon Co., R. L.	58	Smalley-General Co.	60	
Caille Perfection Motor Co.	4, 94, 95	Kermath Mfg. Co.	100	Smith & Co., Edward	53	
Camden-Anchor Rockland Mach. Co.	50	Keys Piston Ring Co.	68	Smith-Serrell Co., Inc.	60	
Campbell Co., A. S.	54	"Knox Motors"	50	Snow & Petrelli Mfg. Co.	56	
Cape Cod Power Dory Co.	57	Koban Mfg. Co.	87	Solheim's Launch Works	60	
Carleton Co.	58	Krice Carburetor Co.	58	Splitdorf Electrical Co.	64	
Carlisle & Finch Co.	58	Kroh Mfg. Co.	50	Standard Co., The.	90	
Carlyle Johnson Machine Co., The.	77	L		Standard Motor Construction Co.	2nd Cover	
Carpenter & Co., Geo. B.	70	Lawley, Geo., & Son, Corp.	63	Standard Oil Co.	60	
Carson Motor Co.	74	Leece-Neville Co., The.	55	Stanley Co.	60	
Chelsea Clock Co.	65	Liggett, A. G.	48	Stearns-McKay Co.	64, 69	
Chicago Examiner	48	Lipman Mfg. Co.	58	Sterling Engine Co.	4th Cover	
Classified Advertisements	46, 47	Lobee Pump & Mach. Co.	53	Stone Mfg. Co.	53	
Columbian Brass Foundry	96	Lockwood-Ash Motor Co.	79	Sturtevant Co., B. F.	60	
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Crockett Co., The David B.	57	Lord, Frederick K.	48	Swasey, Raymond & Page	48	
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Curtiss Aeroplane Co., The.	50	Lunkenheimer Co.	63	Tams, Lemoine & Crane	42	
Curtiss Co., J. H.	60	M		Ten-in-One Strainer Co.	62	
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Dachel-Carter Boat Co.	50	McFarlan & Spilker Mfg. Co.	55	Thermex Silencer Works	50	
Davis Boat Works	50	McQuay-Norris Mfg. Co.	85	Thompson Bros. Boat Mfg. Co.	88	
Deering Boat Mfg. Co.	69	Machek & Co., A. J.	58	Tiebout, W. & J.	67	
Defoe Boat and Motor Works	63	Marine Compass Co.	56	Tillertite Quadrant Co.	63	
Detroit Lubricator Co.	65, 97	Mason Machine Works	58	Toppan Boat Mfg. Co.	53	
Doman Co., H. C.	54	Masten Co., G. H.	48	Tracy Still Mfg. Co.	50	
Detroit Standard Gear Co.	66	Mathis Yacht Building Co.	81	Trimont Rotary Power Co.	47	
Du Bois Mach. Shop, Inc.	54	Matthews Boat Co., The.	83	Trinity Bell Elec. Mfg. Co.	60	
Durkee & Co., C. D.	65	Michigan Wheel Co.	55	U		
E		Miller Gas & Vacuum Eng. Co.	68	Universal Motor Boat Supply Co.	53	
Eastern Scientific Apparatus Co.	69	Missouri Engine Co.	56	Universal Motor Co.	52	
Eich Co.	2nd Cover	Morton Motor Co.	66	Universal Safety Starter Co.	61	
Enhaus, Wm., & Son	58	Monarch Valve Co.	58	Upson-Walton Co., The.	52	
Erd Motor Co.	61	Montgomery & Ward Co.	48, 50, 60	V		
Ericsson Mfg. Co.	85	Morristown Boat & Engine Works	68	Valentine & Co.	49	
Evinrude Motor Co.	77	Motor Boat & Auto Supply Co.	57	Valley Boat Co.	66	
F		Mott Iron Works, J. L.	70	Van Blerck Motor Co.	2	
Fay & Bowen Engine Co.	99	Mullins Co., W. H.	82	Vim Motor Co.	62	
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Fort Hill Laboratory	54	National Marine Lamp Co.	53	W		
Friskie Motor Co.	75	Naval Architects & Yacht Brokers	48	Waterman Motor Co.	88	
G		Nelson Blower & Furnace Co.	52	Watkins Motor Co., The.	60	
Gardner & Co., Wm.	44	Newfield, Silver Mfg. Co.	56	Whitaker, M. M.	48	
Gas Engine & Power Co., and Chas. L. Seabury Co., Consolidated	6	New York Yacht, Launch & Engine Co.	52	Wicker-Kraft Co.	72	
Gielow & Orr	43	Niagara Motor Boat Co.	72	Wilcox, Crittenden & Co., Inc.	55, 72	
Gies Gear Co.	67	Nock, Frederick S.	55	Wilmarth, Morman Co.	50	
Gillespie & Sons, Chas. H.	57	Norma Co. of America	67	Willis Co., E. J.	52	
Goblet, Wm. H.	58	Northwestern Motor Co.	56	Winton Engine Works	98	
Gordon Propeller Co.	55	O		Wisconsin Machinery & Mfg. Co.	60	
Gray-Hawley Mfg. Co.	50	Oberdorfer Brass Co., O. L.	67	Wisconsin Motor Mfg. Co.	71	
Gray, Henry	54	Oil Products Co.	57	Witte Engine Works	54	
Gray Motor Co.	59	P		Wolverine Motor Works	57	
Great Lakes Boat Bldg. Corp.	78	Palmer Bros.	58	Wright Machine Co.	86	
Gulf Refining Co.	69	Paragon Gear Works	91	Y		
		Peerless Marine Motor Co.	93	Youngs, Wm. P., & Bros.	60	

Naval Architects
and
Yacht Brokers.

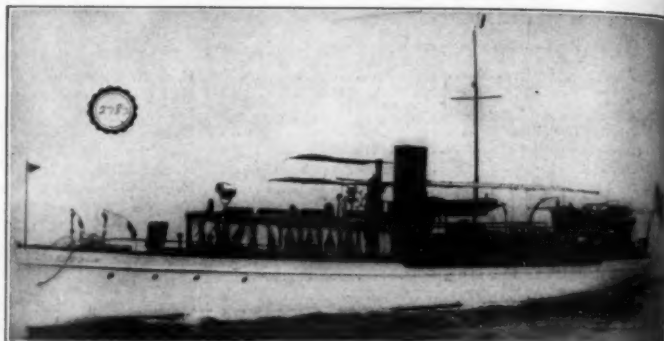
COX & STEVENS

15 William St., New York
Telephone—1375 Broad
Cable—BROKERAGE

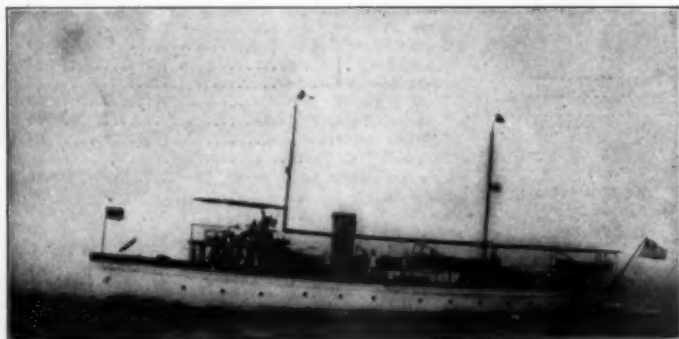
We have a complete list of all steam and power yachts, auxiliaries and houseboats available FOR SALE and CHARTER. A few are shown on this page. Plans, photographs and full particulars furnished on request. Catalogue illustrating types and sizes of yachts we have for sale will be mailed on application.



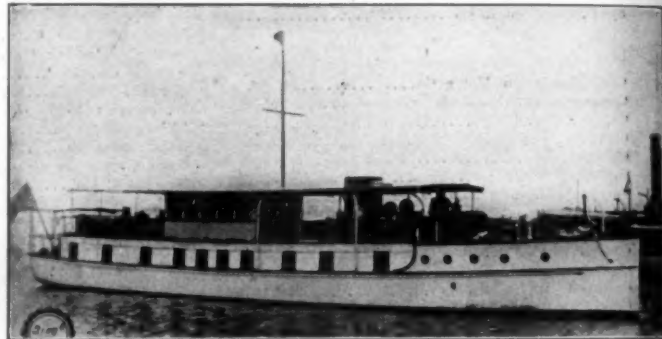
No. 85.—For Sale or Charter.—200 ft. steam yacht; speed, 12 to 14 knots. Very able and roomy craft. Price attractive. Cox & Stevens, 15 William Street, New York.



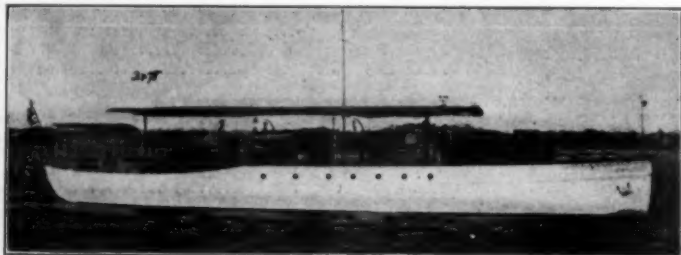
No. 2782.—For Sale or Charter.—Fast, twin screw power yacht; 99 x 14 x 4.6 ft. Speed up to 19 miles. Large dining saloon forward; three staterooms, bath, etc., aft. Adapted for ferry service or general cruising. Cox & Stevens, 15 William Street, New York.



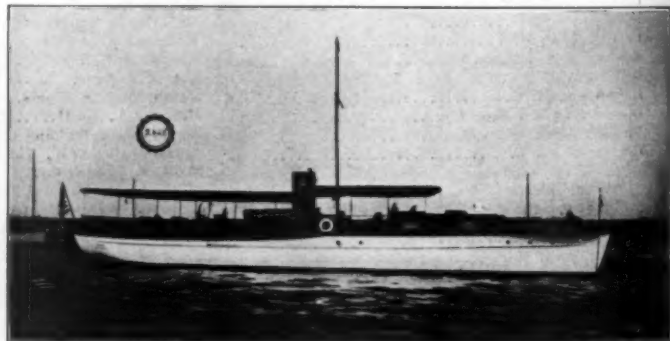
No. 1279.—Offer Wanted.—Modern twin screw cruising power yacht; 98 x 16 x 5.6 ft. Speed, 13 miles; two 75/90 H. P. 6-cyl. Standard motors. Large deck dining saloon; four staterooms, main saloon, bath, two toilets, etc., aft. Handsomely finished and furnished. Special opportunity. Cox & Stevens, 15 William Street, New York.



No. 2100.—For Sale or Charter.—Modern twin screw gasoline houseboat; 95 x 19 x 3.3 feet. Speed 13-14 miles; two 100 h.p. motors. Large social hall on deck. Dining saloon, four double staterooms, bath, etc. Very desirable craft. Cox & Stevens, 15 William St., New York.



No. 2478.—For Charter or Sale.—Exceptionally roomy, twin screw power yacht; 77 x 16.6 x 3.6 ft. Speed, 11 miles. Accommodations include two saloons, three staterooms, bath, two toilets, etc. All conveniences. Cox & Stevens, 15 William Street, New York.



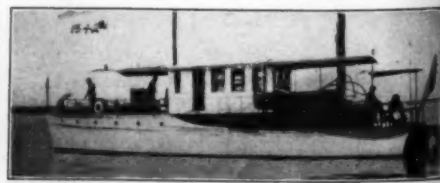
No. 2428.—For Sale.—Attractive gasoline cruiser; 75 x 14 x 4.6 ft. Built by well known firm 1913. Speed 12 miles. Sterling motor. Dining saloon and galley forward; two double staterooms and bath aft. Cox & Stevens, 15 William Street, New York.



No. 1937.—For Sale.—Modern gasoline cruiser; 65 x 12 x 3.9 ft. Built 1912. Murray & Tregurtha motor; speed 12 miles. Large saloon forward of engine room and galley; main saloon, double stateroom and bath-room aft. Price low. Cox & Stevens, 15 William Street, New York.



No. 3170.—For Sale.—Raised deck cruiser; 48 x 13 x 2.9 ft. Built 1915. 25/35 H.P. Sterling motor; speed, 10 miles. Stateroom, saloon, toilet, galley, etc. Electric lighted. Complete equipment. Price attractive. Cox & Stevens, 15 William Street, New York.



No. 1342.—For Sale or Charter.—Very roomy 60 ft. gasoline cruiser. Speed 11-12 miles. Deck saloon, double and one single stateroom, main saloon, bath, two toilets, large separate galley, etc. Cox & Stevens, 15 William Street, New York.

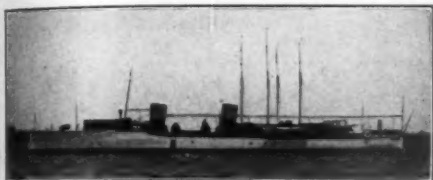
STANLEY M. SEAMAN

TELEPHONES { 3479 } CORTLANDT
3171
BRITISH CORRESPONDENT

YACHT BROKER
220 BROADWAY, N. Y.
(ESTABLISHED 1900)

CABLE, "HUNTSEA," N. Y.
MARINE INSURANCE

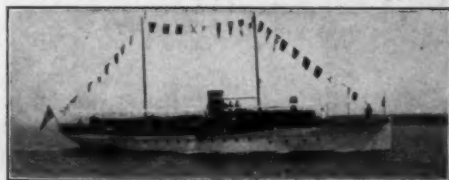
The yachts advertised below represent the finest of the size and type for Sale and Charter, every one of which we can recommend. Full particulars, plans and photographs mailed immediately upon request. Our 1916 Illustrated Yacht List will be mailed free to those interested.



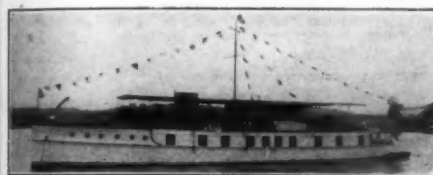
5596—125 ft. Twin Screw Steel Steam Cruiser. Speed 21 miles per hour. 3 staterooms and bath. Cost over \$70,000. Low price.



8001—Twin Screw 105 foot Cruiser. 4 staterooms. 2 baths. Standard motors. Speed, 21 miles.



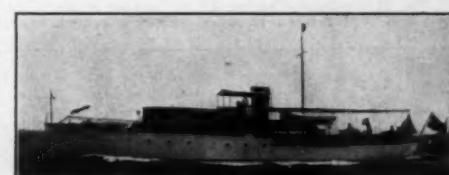
8022—98 ft. Twin Screw Seagoing Cruiser. Practically new. Speed 14 miles. All modern appointments.



7744—95-foot Twin Screw Ideal American Cruiser. 3 ft. 3 in. draught. 4 staterooms. 2 baths. Speed 14 miles. Hot water heat. Perfect condition.



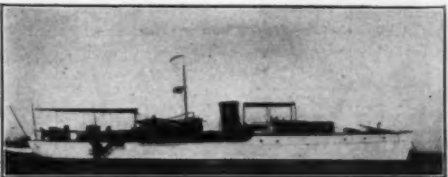
7920—Ablest 95 foot Seagoing Cruiser available. 2 staterooms. Every convenience.



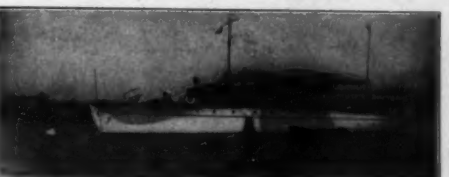
8241—83 foot Twin Screw Lawley Coast Cruiser. Modern appointments. Perfect condition.



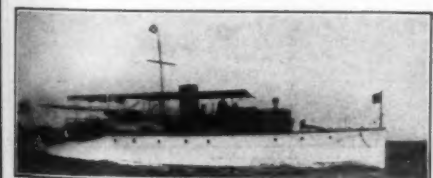
8124—Exceptionally fine Lawley Seagoing Cruiser. 2 staterooms and bath. Deck dining saloon. 6-cylinder Standard motor. Perfect condition. Low price.



8247—Twin Screw 76 foot Lawley Fast Coast Cruiser. 2 staterooms and bath. Speed, 13 knots.



8204—75 foot Twin Screw Seagoing Cruiser. Exceptionally able. 2 staterooms and bath. Low price.



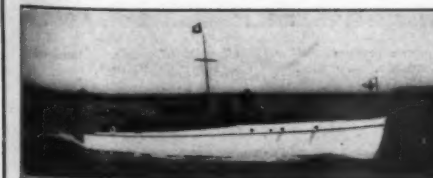
8103—71 foot Twin Screw Fast Coast Cruiser. 2 staterooms. Bath. Speed, 13 miles. Perfect condition. In commission.



8230—59 foot Twin Screw Express Coast Cruiser. Launched 1915. Sterling engines. Speed, 30 miles per hour. Wonderful sea boat. Perfect condition. Only craft of character available.



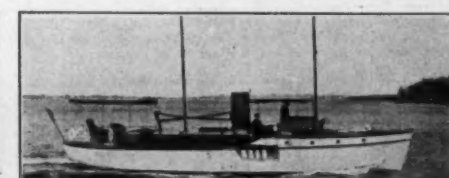
8133—55-foot Cruiser. Double stateroom. Saloon. 2 toilets. Beautiful condition.



8260—52 foot Lawley Fast Cruiser. Fine accommodations. Speed, 13½ knots. Low price.



8219—54 foot Elco-de-Luxe Express Cruiser. Elegant appointments. 60 H.P. self-starting Standard engine. Speed, 16 miles. Low price.



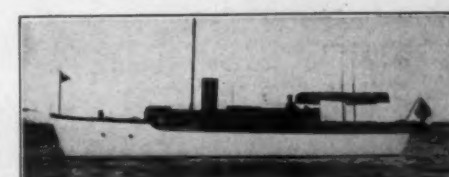
8207—The finest 50 foot Coast Cruiser available. 2 staterooms. Standard motor. In commission.



8279—40 ft. Coast Cruiser. Stateroom. Saloon. New 25 Loew-Victor 1916. In commission.



8206—40 foot Express Cruiser. New 1915. Speed, 25 miles per hour. Wonderful sea boat.



8106—The finest 41-foot Cruiser for sale. Halaco motor. Low price.

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TAMS, LEMOINE & CRANE

NAVAL ARCHITECTS AND YACHT BROKERS

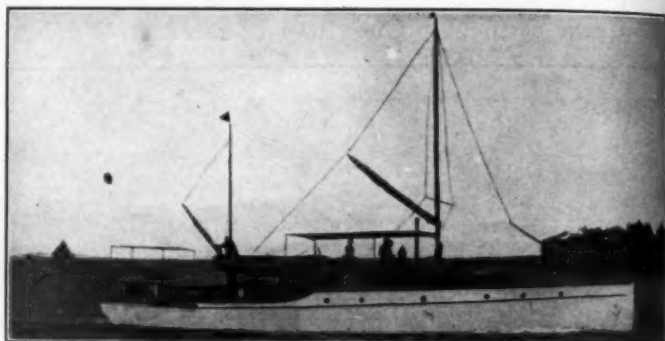
Telephone
4510 John

52 Pine Street
New York City

Offer for sale the following yachts, a number of which are available for charter



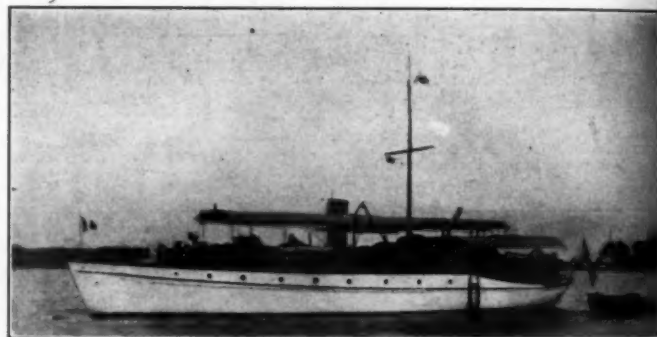
No. 8178.—Sale—Charter—85 ft. modern motor yacht. Excellent accommodations. Standard motor, speed 12 miles. Electric lighted. Large deck space.



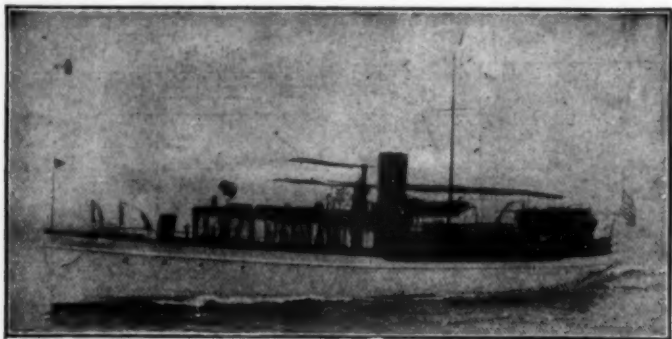
No. 8535.—Sale—Charter—Able seagoing motor cruiser, 64' x 12' 6" x 4' 5". 6-cylinder Loew-Victor, 60 H.P. motor; 2 staterooms, saloon, bathroom, etc.



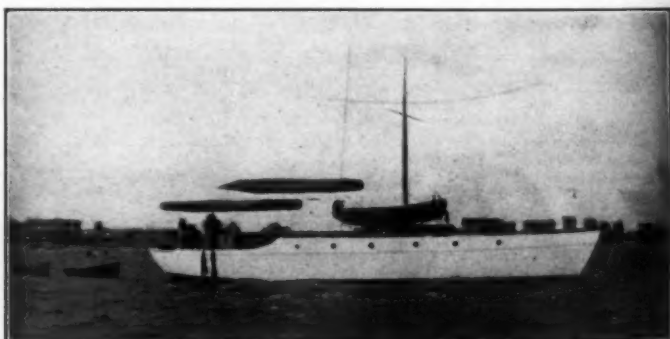
No. 8750.—Sale—Charter—Most desirable twin screw gasoline cruiser available. 84 ft. x 14 ft. x 4 ft. draft. Designed by us and built 1914. Excellent accommodations.



No. 7674.—Sale—Charter—Modern twin screw motor yacht 75' x 17' 6" x 3' 8" draft—20th Century motors. Speed, 12 miles. One double and one single stateroom and very large main saloon.



No. 7758.—Sale—Charter—Fast 99 ft. gasoline cruiser. Three owner's staterooms, large deck dining saloon and good after deck.



No. 7579.—Sale—Charter—Modern cruiser, 55' x 11' 6" x 3' 6" draft. Standard motor; speed, 11 1/4 miles. 2 staterooms, saloon, 2 W. Ca.; electric lighted, etc.



No. 8338.—Exceptional opportunity to purchase the best of the smaller raised-deck cruisers available—43 ft. x 10 ft. x 3 ft. 8 in. draft. 40 H.P. Blount Motor new 1914. Speed 10 miles. Lighted by electricity. Stateroom with two berths and saloon 2 transom berths. Has toilet room, good galley and engine room. Abundance of locker room. Is a comfortable cruiser and of good sea-going qualities.



No. 8279.—Sale—Price attractive. Desirable raised-deck cruiser. Lawley build. 60 H.P. Lamb motor, speed 17 miles. Stateroom with 2 berths, saloon, 2 transom berths, toilet room, electric lights, etc. Excellent condition throughout.

NAVAL ARCHITECTS
ENGINEERS,
BROKERS,
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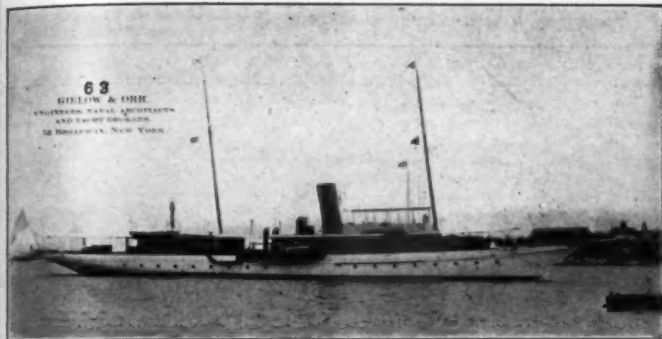
GIELOW & ORR

52 Broadway, New York

Telephone, 4673 Broad.

Cable Address:
Crogie, New York
A. B. C. Code

It can be conservatively stated that the demand for yachts for the coming season will far exceed the supply. We therefore suggest that those contemplating buying or chartering make their decisions early to avoid inevitable disappointment.



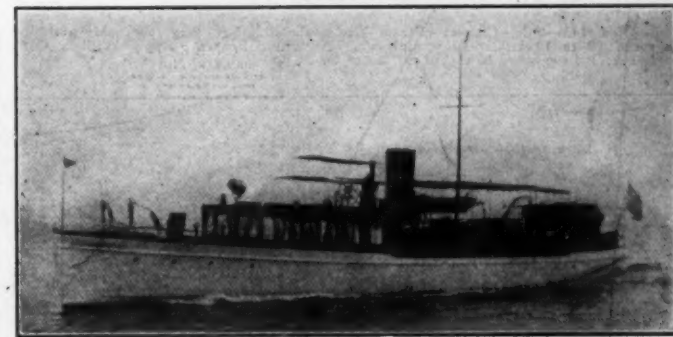
No. 63—For Sale or Charter—155-foot cruising steam yacht. Speed up to 18 miles. Fine accommodations. Low price.



No. 4—For Sale or Charter—190-foot cruising steam yacht. Now in commission. Excellent accommodations. Fine condition throughout.



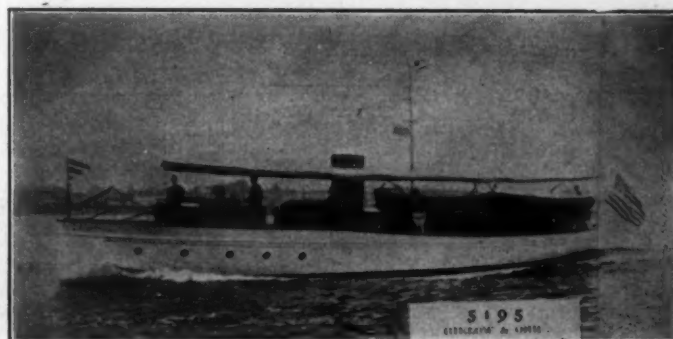
No. 434—For Sale or Charter—Auxiliary steam schooner, 162 feet x 120 feet x 28 feet x 16 feet draft. Unusually fine seaboard. Excellent accommodations. Has every convenience for offshore cruising.



No. 3659—For Sale or Charter—High class 100-foot twin screw motor yacht. 3 staterooms. Bathroom. Deck dining saloon. Large bridge and after deck. Speed up to 18 miles. Reasonable.



No. 5065—Sale or Charter—106-foot flush deck cruising motor yacht, 4 staterooms, large deck dining room, bath room, electric lights, etc.



No. 5195—For Sale—Bridge deck cruising motor yacht, 65 x 14 x 4 feet. 1915 construction. Speed 12 miles. 6-cylinder 65-70 H.P. motor. Sleep 8 in owner's party. Fine seaboard. Every convenience.



No. 4250—For Sale—High class 76-foot twin screw cruising motor yacht, two double staterooms, deck dining saloon, bath room. Will be delivered in commission in first class condition.



No. 4266—For Sale or Charter—95-foot twin screw semi-houseboat. 4 double staterooms. Unusual accommodations. Excellent condition throughout. Subject to closest inspection. Fine seaboard.

WILLIAM GARDNER

FREDERICK M. HOYT

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WILLIAM GARDNER & CO.

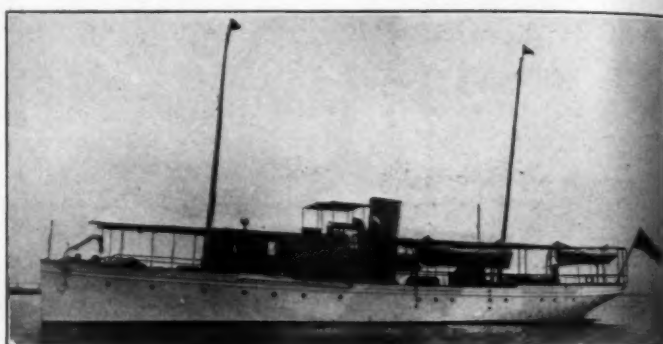
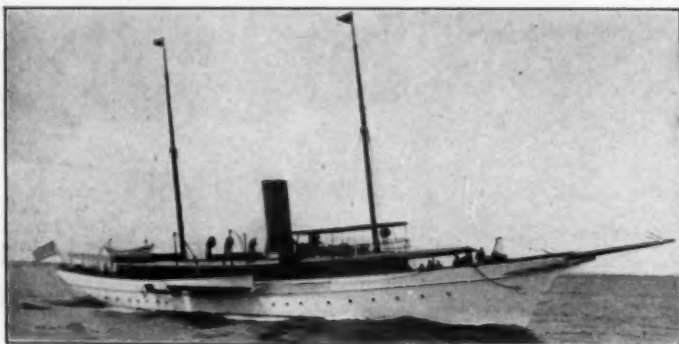
NAVAL ARCHITECTS, MARINE ENGINEERS AND YACHT BROKERS

Telephone Call
3585 Rector

1 BROADWAY, NEW YORK

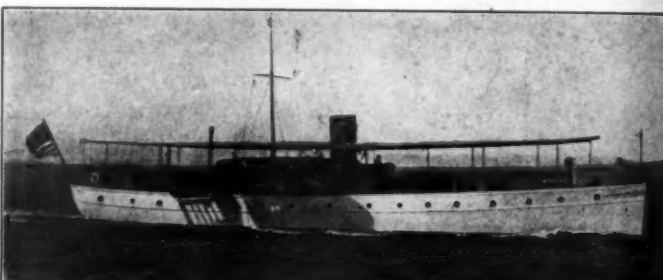
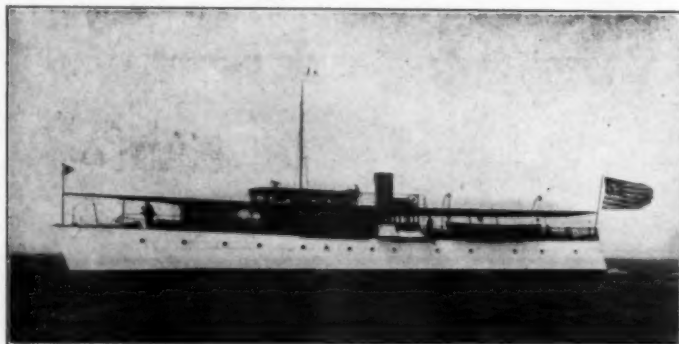
Cable Address
Yachting, N. Y.

We have a complete list of Yachts of every description for sale and charter. Plans, Photos and full particulars furnished on request



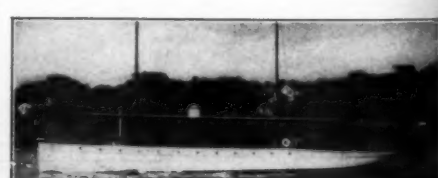
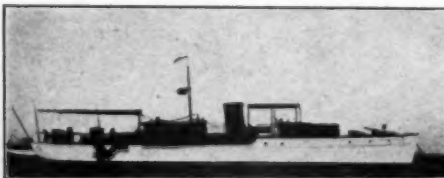
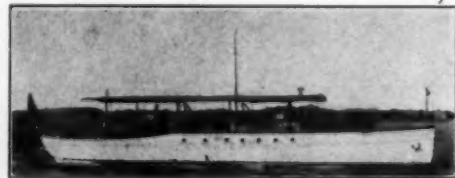
No. 143—Sale—Charter—Steam Yacht, about 200 ft. long, very able and roomy, speed 12 to 14 knots; in commission. Attractive figures. Apply William Gardner & Co., 1 Broadway, New York.

No. 1624—Gasoline yacht, 95 x 18, large six-cylinder Standard motor, good speed.



No. 1238—For Sale—Cruising Motor Yacht, 125 x 20 x 6.3, speed 12 knots. Well constructed and exceptionally able and roomy.

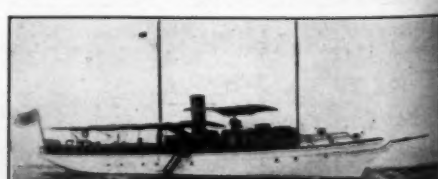
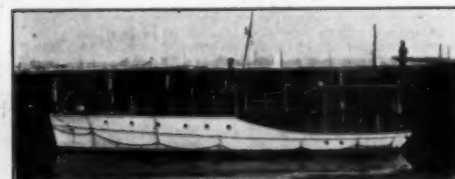
No. 1821—Fine Coastwise Cruiser, flush deck, twin screw, 90 x 15.3, two 6-cyl. Holmes motors.



No. 1893—Summer Charter—Twin screw power yacht, 74 x 17, two Twentieth Century motors, excellent accommodation.

No. 1850—Twin screw, Lawley built, 76 x 12.6, two staterooms, bath, etc. Speed 13 knots.

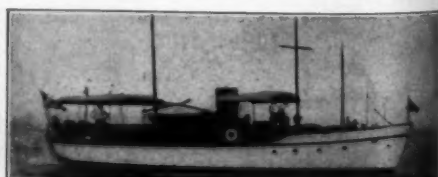
No. 1760—Raised deck cruiser, 85 x 15.6, built 1911, six-cylinder Standard motor, comfortable accommodations.



No. 2115—Raised deck cruiser, 52 x 11.6, forty H.P. Standard motor, with deck controls.

No. 1423—Raised deck cruiser, 55 x 12, Standard motor, with deck control.

No. 1325—Attractive cruiser, 90 x 14.6, two Twentieth Century motors, four staterooms, bath, saloon, etc.



No. 1424—Bridge deck cruiser, Lawley built; 52 x 8.6; six-cylinder motor, speed 14 miles. Engine controls on deck.

No. 2140—Modern Cruiser, 43 x 10.6, built 1911, Standard motor, complete outfit.

No. 1869—Sale—Charter—Bridge deck cruiser, 56 x 12 x 3, 40 H.P. motor; attractive figure.

HENRY H. JENNINGS

HERMAN JAGLE

H. H. JENNINGS COMPANY

FORMERLY KNOWN AS

JENNINGS YACHT BROKERAGE COMPANY

AMERICAN AND FOREIGN YACHTS

Merchant Vessels for Sale and Charter

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Yachtbroco, New York

45 Broadway

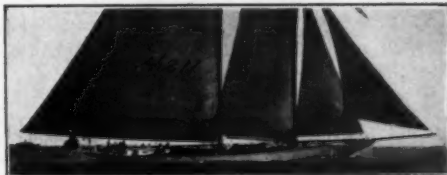
New York City

Surveying
Marine Insurance

Our list comprises all the available yachts for sale and charter. Below are a few of our offerings. If none of these appeal to you, write us your requirements. Our knowledge of the yachts we offer, and our 22 years' experience in the business, insure satisfaction to any one buying or chartering a yacht through this office.



No. 4117—63-foot auxiliary centreboard yawl; 4 feet draught. Two staterooms and saloon, sleep five. Speed under power 8 miles. An exceptionally fine craft.



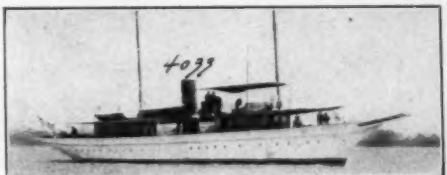
No. 4211—125-foot steel schooner. Five staterooms, large saloon, four baths. One of the best racing and cruising schooners available.



No. 4177—90-foot keel schooner; built 1913. Two double staterooms and saloon, bathroom, etc. Up-to-date and one of the finest schooners of her size.



No. 2931—110-foot steam yacht. Three staterooms, saloon and dining saloon, bath, etc. Price low, or will trade for power cruiser.



No. 4033—140-foot steel steam yacht. Seven staterooms, two baths, saloon and dining saloon. Speed up to 16 miles. Up-to-date in every respect.



No. 1640—36-foot bridge deck cruiser, 20 H.P. motor. Speed 9 miles. Electric light. Accommodation for four people.



No. 1567—50-foot bridge deck cruiser. Two staterooms and saloon. Two toilets. 28 H.P. motor. Speed 11 miles. Electric lights, etc.



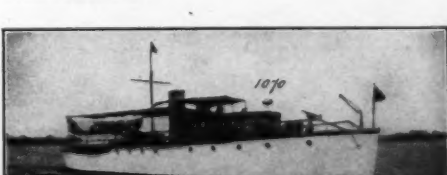
No. 1735—74-foot fast cruiser, suitable for ferry service. Double planked mahogany. Good accommodation. 100 H.P. 20th Century motor. Speed 16 to 20 miles. Price reasonable.



No. 1700—50 ft. cruiser built 1915. Stateroom and saloon; sleep six. Sterling motor. Speed 10 miles. Electric lights, etc. Splendid proposition.



No. 1636—Sale or Charter—50-foot Cruiser. Stateroom and saloon, sleep seven. Bathroom. Speed, 10 miles.



No. 1070—85-foot twin screw steel power yacht. Three staterooms, saloon, bath, etc. Speed, 14 miles.



No. 976—60-foot ocean going cruiser. Winner of Bermuda Race. Two staterooms, saloon, etc. Craig motor. Speed 14 miles. Owner has larger yacht, and is anxious to sell.



No. 971—Sale or Charter—37-foot cruiser, stateroom and cabin, sleep four, 20 H.P. Buffalo motor. Electric light, etc. Speed 9 miles.



No. 1229—65-foot twin-screw cruiser. Two staterooms, saloon, bath, etc. Speed 13 miles.



No. 1731—50-foot twin screw cruiser; large saloon with two transom berths and Pullman berth. Two 35 H.P. motors. Speed 15-17 miles. Splendid proposition.



No. 1733—43-foot houseboat and cruiser. Similar to picture. Just completed. Double stateroom and saloon; sleep 6 to 8 people. 30 H.P. engine.



No. 4099—80-foot power houseboat. Three staterooms, bath, etc. Speed 7 miles. Bargain for quick sale.



No. 1048—57-foot Lawley cruiser. Double stateroom and saloon with three berths. Standard motor. Electric lights. Speed 10-12 miles. Price reasonable.

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The rate for "For Sale" and "Want" advertisements is 3 cents per word, minimum 75 cents. If an illustration is used, the charge is as follows, which includes the making of the cut:
 Cut one inch deep, one column wide..... \$2
 Cut 1 1/4 inches deep, 1 1/4 columns wide..... \$5
 Cut three inches deep, three columns wide..... \$15

Opportunities
 for the
 Motor Boatman

Before you buy or before you sell examine the exceptional buying and selling opportunities under this heading. They comprise the best offers of the month. Please mention MoToR Boating.

A FEW RARE BARGAINS IN NEW AND SECOND-HAND ENGINES

2-cylinder, 20 H.P. 2-cycle Mianus engine, in excellent condition, with reverse gear, two carburetors, Gray & Hawley outfit, three-blade propeller, mechanical oiler, magneto, muffler, spark coil and plugs, \$140.

New 6-cylinder 60 H.P. Loew-Victor engine, absolutely new, never uncrated, taken in exchange for a 200 H.P. Duesenberg engine; owner decided to build a larger boat after buying engine. Regular price, \$1050; special price, \$700.

Model 13, 4-cylinder 4 3/4 x 5 1/2 25 H.P. Loew-Victor engine, used but two months, taken in trade for a 6-cylinder Loew-Victor engine. Regular price, \$695; first check for \$475 takes this engine.

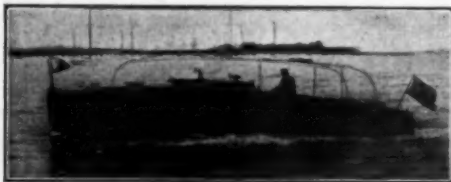
Two 3-cylinder 4 3/4 x 5 1/2 18 H.P. Loew-Victor engines in excellent shape. Regular price, \$525; special price, \$275, F. O. B. New York.

Two 3-cylinder Smalley engines, with reverse gears, good condition, \$90 each.

3-cylinder 20 H.P. Palmer engine, Paragon reverse gear, in excellent condition, \$125 net.

Model 10, single-cylinder, 6 H.P. Loew-Victor engine, absolutely new; used for sample purposes, with complete equipment, \$180 net.

LOEW-VICTOR ENGINE CO., OF NEW YORK,
 120 BROADWAY, NEW YORK CITY



TOOSOON—Fast Thirty-five-foot Semi-Cruiser, Sixty Horsepower, Six-Cylinder Loew-Victor Engine, never stopped. Best construction. Good headroom. Has Toilet, Galley, Ice Box, Buffet, etc. Used two short seasons. Building larger boat. Will sell complete or hull only at low price. Richard Hutchison, Thirty-five Federal St., Boston, Mass.

EXCEPTIONAL BARGAINS

Owing to changes in our models we have a stock of brand new Propellers, Spark Coils, Carburetors, Steering Wheels and other accessories, which we are now selling at less than actual cost, as follows:

	Each
1-23" 3B Cast Iron propeller, 1 1/4" taper bore—threaded.....	\$12.80
1-Michigan 1 1/4" taper bore 24x44" 3B Bronze propeller.....	16.15
1-Michigan 1 1/4" taper bore 24x41" 3B Bronze propeller.....	16.50
1-Michigan Auto Speed 1 1/4" taper bore 24x40" 3B Bronze propeller.....	16.15
1-Michigan Auto Speed 1 1/4" taper bore 24x32" 3B Bronze propeller.....	8.30
1-Michigan Auto Speed 1 1/4" taper bore 20x38" 3B Bronze propeller.....	10.85
1-Michigan Auto Speed 1 1/4" taper bore 20x36" 3B Bronze propeller.....	2.00
1-Michigan Auto Speed 1 1/4" taper bore 20x34" 3B Bronze propeller.....	8.30
1-Harthan 1" bore 20x30" 3B Bronze propeller.....	13.50
1-Columbian 3/4" bore 15x30" 3B Bronze propellers, each.....	5.20
1-Columbian 3/4" bore 15x30" 3B Bronze propeller.....	5.20
1-Bryant & Berry 3/4" bore 15x30" 3B Bronze propeller.....	4.50
1-Trout 3/4" bore 15x30" 3B Bronze propeller.....	5.40
1-Bryant & Berry 3/4" bore 17x28" 3B Bronze propeller.....	5.45
1-Columbian 3/4" bore 16x30" 3B Bronze propeller.....	5.50
1-Columbian 3/4" bore 15x35" 3B Bronze propeller.....	4.90
1-Pierce 3/4" bore 16x32" 3B Bronze propeller.....	5.10
1-Harthan 1 1/4" bore 20x30" 3B propeller.....	8.05
1-Harthan 3/4" bore 17x34" 3B Bronze propeller.....	5.30
1-Norwalk 3/4" bore 16x30" 3B Bronze propeller.....	3.40
1-Michigan 3/4" bore 16x34" 3B Bronze propeller.....	4.25
1-Michigan 3/4" bore 16x32" 3B Bronze propeller.....	7.40
2-Columbian 3/4" bore 14x15" 3B Bronze propellers, each.....	2.15
1-Norwalk 1" shaft 14" 3B Reversible propeller, each.....	12.10
1-Norwalk 3/4" shaft 16" 3B Reversible propeller.....	27.15
2-National Box Star Coils (2 Unit).....	4.00
2-National Box Star Coils (1 Unit).....	2.00
14-National Dash Coils (1 Unit).....	6.50
2-Kinaston Carburetors (1 inch).....	5.00
2-Hers Timers (1 Cylinder).....	4.00
18-Gravity Sight Feed Oil Cups (1/2").....	1.90
15-16" Polished Brass Steering Wheels with Hardwood Handles.....	1.50

THE W. H. MULLIN COMPANY
 Salem, Ohio, U. S. A.

FOR SALE—One model R-1, 8-cylinder, 6 3/4 x 9, 300 H. P. Sterling motor with electric starter and complete equipment. In perfect condition. Reason for selling, owner is installing larger engine. This is one of the three motors removed from the express cruiser MAROLD. Two have already been sold. An exceptional opportunity to secure a better than new motor at a very reasonable cost. Address: Owner's representative, Capt. Ivan C. Lundblom, care of The Mathews Company, Port Clinton, Ohio.

Houseboat, on sound. Brand new. Furnished or unfurnished. Cost \$2000. Price \$1200. Photograph. Room 1804, Ashland Bldg., New York.

FOR SALE—One Caille 5-speed rowboat motor, used three months, dual ignition, runs fine. \$58.00. Karl Wagner, 1901 Jefferson St., Madison, Wis.

Varnished cedar 21-foot runabout, 15 horse, 3-cycle Ferro, automobile control, rear starter, full equipment, including electric lights, 15 miles. Price \$325.00. Details and photographs on request. F. C. Barton, General Electric Company, Schenectady, N. Y.

ELECTRIC LAMP BARGAINS SET \$4.75. Westinghouse lamps. High class. Black and nickel. Black and brass. Head light and red and green side lamps. Closing out job lot. Schmitz Bros., Cor. Station & Collins, East End, Pittsburgh, Pa.



FOR SALE at your own price, 50 ft. glass cabin cruiser, 125 H.P. 5 1/2 x 6.6 cylinder, Van Blerck motor, equipped with latest oiling system. 12-14 miles. Have no use for this boat. Care MoToR Boating.



This Express Runabout for sale "Right"—All Mahogany, copper fastened, nickel plated brass, trim, 26 ft. long, 5 ft. beam. Speed 19 miles per hour, 25 H.P. four-cycle motor, full bulkhead control, including starter. All bright and new. For detail, description and price apply to W. A. Bowers, Ogdensburg, N. Y.



FOR SALE—Exceptionally fine 40 ft. x 10 ft. 6 in. x 36 in. bridge deck cruiser; built 1913. 30-48 H.P. Speedway motor new 1915; Bosch-Ruhamore self-starter. Accommodations for 4-5. Double stateroom; two toilets; galley with hot water heater, alcohol range, large ice box, etc. Equipment complete, including Davis dink 1915. Price attractive for immediate sale. Edward P. Farley Co., 1501 Railway Exchange Bldg., Chicago, Ill.

WANTED—Modern motor cruiser to accommodate 4 to 6; comfortable cabins. Will charter with view to buying. From July to Sept. Send full particulars. Responsible party. Robt. H. Spurgeon, Jr., 639 St. Johns Pl., Brooklyn, N. Y.

YOU SAVE \$150 on this Runabout, 23 ft., 3-cylinder 12 H.P. Ferro engine with reverse gear, Hyde wheel, khaki top and full equipment. 15 miles.

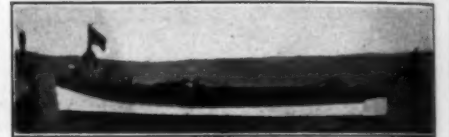
25-foot hydroplane hull designed by Bath Marine Construction Co., with 4-cylinder 30 H.P. engine, shaft, propeller, nickle steering wheel and fittings.

One Orswell master vibrator, three Orswell plugs and one Perflex plug, all for \$10. W. C. Baker, Brunswick, Maine.

FOR SALE—Platinum points and contact springs and screws for all makes Ignition Systems. Magnets and coils repairing our specialty. Smythe Ignition Co., 3217 Locust St., St. Louis, Mo.

\$89—New 35 x 8 cruiser, seen New York. 24 x 6.8 cruiser, \$250 complete with engine. 51 ft. 16-mile power yacht cheap. Philadelphia, 35 ft. Portland. Modern Yacht Co., Bath, Me.

Cabin cruiser, 42 x 9 x 3. Three years old. Twin screw. With or without power equipment. Good speed and fine sea boat. R. W. Brockway, Moodus, Conn.



ELEGANT RUNABOUT, 30 x 6, 4-cycle, 4-cyl. engine. Beautiful quartered oak deck and paneled cockpit. Large lazy back seat, wicker chairs, pullman table, folding top with curtains. Brass fastened and fitted for salt water. Complete inventory. Full light equipment. Life preservers, etc., etc. Fine condition, like new—used. Bargain. F. A. Hill, 5638 W. Lake St., Chicago.



Ideal day cruiser "Margus," 36 x 7.6 x 3. Practically new. Finest material, workmanship and equipment. Mahogany interior. 45 H.P. Sterling motor. Perfect condition. Automobile control. Every modern accessory for cruising comfort and safety. Speed, twelve miles. Genuine bargain. Further specifications and price on request. Chas. R. Flos, Ogdensburg, N. Y.

FOR SALE—Roban 2-cylinder Outboard motor, mag neto type, with carrying Trunk, \$60.00. Used one season. Original cost \$105.00. W. J. Weatherwax, Jefferson Bldg., Peoria, Ill.



FOR SALE CHEAP—Cruiser 36-8 ft. Built in Oct. 1914. Used as supply boat to dredges, job finished, as further use for boat. Has 25 H.P. Van Blerck Engine. Kreger Groc. Co., 60 Biddle Ave., Wyanotte, Mich.

WANTED—Cruiser of eighty feet or more. Fully found, and ready for service, in exchange for stock of unquestioned merit in industrial corporation. Deals that are in course of construction should bring a continuous dividend of over ten per cent. Field of usefulness of our process patent is one of the greatest and includes the drying of vegetables and is attracting the attention of the warring nations. We dry at a temperature that does not cook. All information given. The Mark Process Dryer Co., 716 Fisher Building, Chicago, Illinois.

One 6-cyl., 4-cyc., 60 H.P. high-speed motor, will sell or trade for 3 or 4-cyl., 4-cyc., heavy duty. Jesick Bros. Holland, Mich.

2 to 11 h.p. Fox engine, coils and propeller; fine condition: \$80.00. Elmer Calkins, Petokey, Mich.

A TWIN SCREW OUTFIT 32-37 H.P. STANDARD motor purchased from the Standard Motor & Construction Co., brand new, and installed in July 1915. These engines have been run in a pleasure boat less than 200 miles. They are 4-cylinder, 6 in. bore, 8 in. stroke of the heavy duty type, weighing about 2800 pounds each. They are complete with regular Standard gear driven magnetos, coils, carburetors, reverse gears and propellers. Propellers are 32 in. diameter, 36 in. pitch very wide blades. These motors are guaranteed in every way the same as new. We will sell the pair for \$2250.00 or one at \$1200.00. Particulars Bruns Kimball & Co., Inc. 115 Liberty Street, New York City.

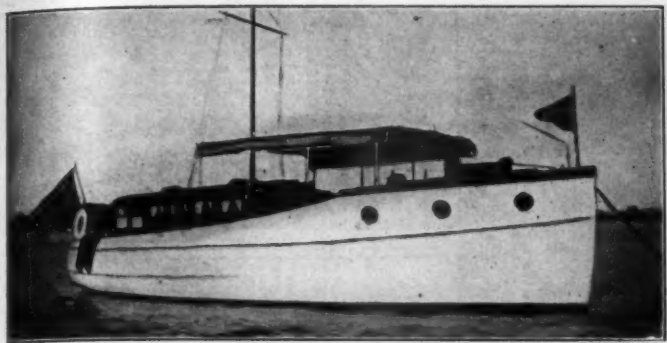
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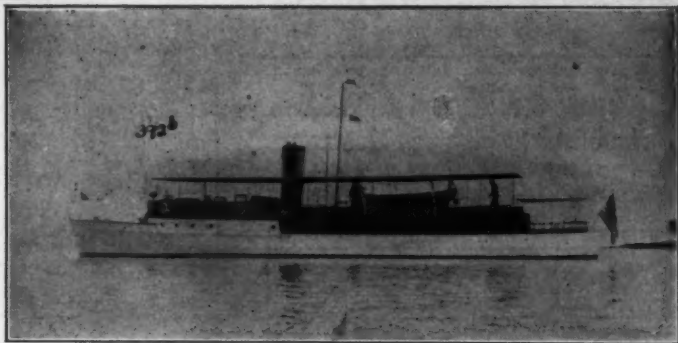
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Opportunities
for the
Motor Boatman

Before you buy or before you sell examine the exceptional buying and selling opportunities under this heading. They comprise the best offers of the month. Please mention MoToR Boating.



No. 2314—For Sale—Bridge deck cruiser; 36 x 9.6 x 3 ft. 20 H.P. RALACO. Designed by Morris M. Whitaker and built under his personal supervision. Large saloon, toilet, galley, etc. Electric lights. Power tender. Cost to build \$4500. Architects' designs, blue prints and complete building specifications on file at our office. Exceptional value at \$2250. Cox & Stevens, 15 William Street, New York.



No. 392—For Sale—Very able power yacht; 92 x 13 x 4.2 ft. Speed, 13-14 miles. 105 H.P. 6-cylinder 20th Century motor. Electric lights. Accommodations include large main saloon with two transom berths, two double staterooms, bath and two toilets, etc. Interior finish mahogany throughout. Unusually large deck space. In excellent condition throughout. Always had best of care. Equipment complete, including power tender and dinghy. Available at attractive figure. Apply to Cox & Stevens, 15 William Street, New York.



No. 1411—For Sale—Sea-going power cruiser, 83 ft. x 14 ft. x 5 ft., designed and built by Lawley. Very substantially constructed. Large double and single stateroom; bath room; large galley and main saloon; two 40 H.P. Murray & Tregurtha engines in separate engine room. Highgrade boat in every respect; very little used; completely equipped. Laid up near Boston. Apply John G. Alden, 131 State Street, Boston, Mass.



Beautiful high-class designed and constructed sea-going type runabout; Spanish Cedar hull, bright finish with mahogany decks and interior trim; hull overhauled and in perfect condition. 100 H.P. Speedway motor in excellent condition, ready for immediate delivery. Speed 19 to 20 miles per hour. Now located in Maine. Attractive opportunity. Apply Gas Engine & Power Company and Charles L. Seabury & Company, Consolidated, Morris Heights, New York City.



RICE STOCK MOTOR BOATS: 16-foot Speed Boats; 19-foot Runabouts; 22-foot Auto Boats. State type interested in. Catalogue on request. Above cut shows 19-foot Runabout. Rice Brothers Company, East Boothbay, Maine.

FOR SALE—Motor Boat supply and engine business, established fifteen years in one of the largest Great Lakes cities. Doing good business. Splendid opportunity. For further information address Box 4, care MoToR Boating.

AUTOMOBILE WANTED—Will exchange new motor boat hull built to order—first class—for used automobile—Buick, Chevrolet, or good runabout. Photo. Box 359, Syracuse, N. Y.

One 12 horse power Cameron Motor, with magneto. Cost \$350.00; been used only few weeks; price \$90.00 cash. Three horse power NoRo detachable Motor, new, \$45.00. Four horse power Lackawanna Motor, \$30.00. 30-3 and 4-cylinder timers. Wilmarth and Morman Co., Grand Rapids, Mich.

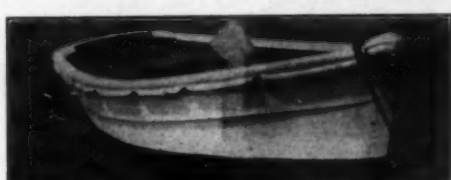
FOR SALE—Two Evinrude 1915 Outboard motors, with Magneto and Automatic Reverse. One never used, \$58.00; one used very little for demonstrating, \$48.00, with Hinged Wood Shipping Cases. Wm. A. Marburg, of A., 32 South Street, Baltimore, Md.

FOR SALE—Mahogany runabout double planked, seating six, 25 ft. x 4 ft. 6 in. x 18 in. 12 H.P. Kermath, 4-cylinder, 4-cycle, double ignition. Excellent condition; beautiful lines; 12 M.P.H. Sell for \$375. Fred W. Gordon, 61 Broadway, New York City.

FOR SALE—Standing top Seabury Launch, 30 x 6 ft. 6 in x 2 ft. 8 in. 12 H.P. 2 cylinder Ferro; speed about 12 miles per hour; new cushions. Full equipment; excellent condition. Price \$375. Fred W. Gordon, 61 Broadway, New York City.

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 5 1/2" x 6" 4-cylinder, 4-cycle, 24 to 30 H.P., \$450.00.
 4 1/2" x 5" 4-cylinder, 4-cycle, 16 to 20 H.P., \$360.00.
 The above are our 1915 model engines, entirely new, and fully guaranteed. They are fitted with extension base, reverse gear, propeller equipment and the usual parts.

4 1/2" x 5" 2-cylinder, 4-cycle, 8 to 10 H.P., new, but with short base. Price bare engine only, \$100.00. 5" x 7" 4-cylinder, 2-cycle, second-hand, but in good mechanical order, no fittings, \$75.00. Miller Gas & Vacuum Engine Co., 2329-31 N. Talman Ave., Chicago.



\$4.00 for limited time; selling these complete fender outfits for round bottom tenders, or flat rowboats. Most practical ever made. Screwed or bolted through gunwales to stay. Canvas covered, specially stuffed. Neat, most efficient. When ordering send boat length from bow to stern measured under bump-strip. Star Fender Co., 1369 52nd St., Brooklyn, N. Y.

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Don't try to buy parts for that old motor. We can sell you one to replace at much less money than you would pay for the parts to put it in running condition. Used motors thoroughly overhauled, put in perfect condition by the manufacturer as follows:
 35 H.P. with carburetor and base for magneto.....\$95.00
 50 H.P. with carburetor and base for magneto..... 95.00
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35 H.P. new with U. S. starting and lighting outfit, carburetor and Connecticut distributor.....180.00

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 1438 Michigan Avenue Chicago, Ill.

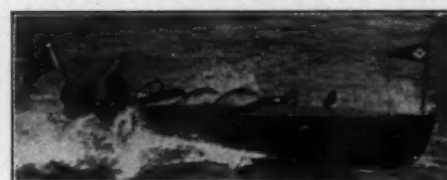
FOR SALE—Two 8-cylinder, 225 H.P. Sterling racing engines. Both of these engines practically new, having had about fifteen hours running; equipped with the latest Sterling oiling system, Bosch magnetos and electric starters; at a price way below what you would expect to pay for them. Have also a Smith 20-foot hydroplane hull, complete with wheel, designed for one of these motors, shaft, strut and gearing, which I will almost give away. Address Box 892, Indianapolis, Ind.

FOR SALE—A bargain, 26 ft. semi-speed boat. Speed over 20 miles, will seat 6 people. Equipped with 6 cyl. 4-cycle 40-60 H.P. motor. Bosch magneto. Auto dash control. For a quick sale no reasonable offer rejected. Walter J. Krause, 7935 Burnham Ave., So. Chicago, Ill. Phone So. Chic. 7426.

FOR SALE—Doman engine, 2-cylinder, 4-cycle, 5 x 6 complete with Perfect ignition, clutch, carburetor and force feed oiler. In fine condition. \$100.00. Fred A. Schletz, 188 King St., St. Paul, Minn.

FOR SALE—24-30 H.P. 4-cylinder Mercury engine; also complete electric starter system. Will sell whole outfit for \$250. Geo. W. Washburn, Catskill, N. Y.

CANADIANS, Second-hand engine bargains. Send for list. GUARANTEE MOTOR COMPANY
 73 Bay Street, North Hamilton, Ont., Canada.



\$47.50 for a limited time, we will sell these seventeen-foot stepless hydroplanes at the above price for complete knock-down boat, which includes mahogany interior and every piece of material necessary to complete the hull. Other models at proportionate prices. Write for circulars. HYDROPLANE CONSTRUCTION COMPANY
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This beautiful residence, situated in fine aristocratic and residential section, with lovely lake view and high elevation, six splendid rooms, house less than two years old. Sale price \$5500; take \$2000 down as first payment, balance arranged. Will consider a 50-foot Auxiliary Schooner, Cruising Yawl or Motor Boat as part payment. Address T. R. Trust, 399 Spadina Ave., Toronto, Canada.

USE "SNAPPER" ENGINES for your small boat. They are a big little engine built by The Automatic Machine Co., Bridgeport, Conn.

WANTED—First class carpenters, boat builders, joiners, plumbers, and pipe fitters; also machine and lathe operators. Matthews Boat Co., Port Clinton, Ohio.

FOR SALE—A six-cylinder Sterling Type B 5 1/2 x 6. This engine has been run but little and is absolutely guaranteed to be in fine running shape. First check for \$650.00 takes it. Address Bargain, 252 Court Street, Rochester, N. Y.

FOR SALE—Twenty-foot runabout. Ten horse, two cylinder engine installed under hatch forward. Good design. Speed ten miles. \$200. Address L. R. Cutler, Freeport, L. I.

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Blower runs by friction contact with engine flywheel. Whistle of brass, nickel-plated.

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BY EXPERIENCE, WRITE
MORRIS M. WHITAKER, N. A.
307 HIGHMOUNT AVENUE " NYACK, N. Y.

Play the Game As You Should

(Continued from page 7)

amateur sailorman!) With the newspaper headline "Adrift for Days in \$1,000,000 Storm" erased from their imagination, these boys could still see in their mind's eye, "Tied to Buoy, Run Down by Tramp Steamer," so the next hour and a half was feverishly spent in fitting a felt-hat gasket. Luck was surely with them, for they got under way and were safely beyond the open, shallow stretches of Winyah Bay before the storm, which turned out to be a hummer, struck. And, oh yes, they limped into Georgetown with the engine coughing over the last few drops of gasoline.

The only redeeming feature of this incident was the crew's ordinary ability to improvise a cylinder-head gasket. For postponing the purchase of a storm anchor for the sake of saving a few cents, and for figuring close on fuel for the same reason—Southport being a dear place—they deserved all that threatened them.

Yet from a perusal of the newspapers we know that such things do happen at times. Here's a man in a twenty-foot open boat whose engine goes dead and leaves him to break up in the surf. The law doesn't require it, but why didn't he have a scull aboard? Too proud? Here's another who runs off his course in a fog and strikes a rock. This brings up another point on which the law is silent, but why didn't this skipper have a compass, or having one, see that it was adjusted? Too "close?" And here's a man whose boat catches afire from a red hot exhaust pipe. The customs inspectors don't test out fire extinguishers, but why hadn't he tried his outfit before the salvage of his boat depended on its efficiency? Too lazy?

These men and others like them may have been too proud, too lazy or too anything else, but principally they were too indifferent to the dictates of good sound common sense. Life preservers aren't of much use to you if they are kept under the cockpit floor and a fog horn is worse than useless if you're too scared to blow it.

The sea is generally kind. If you'll keep away from it when it isn't, and have a due respect for your life when it is, you'll save a lot of trouble for the insurance adjuster.

Trade Literature Received

(Continued from page 38)

A handsome catalogue pertaining exclusively to the new Caille Aristocrat engine has been produced by the Caille Perfection Motor Co., of Detroit, Mich. This motor is a four-cylinder four-cycle 14 h.p. machine equipped with electric starting and lighting outfit, Bosch high tension magneto and Schebler carburetor. It may also be had with a hand rear starter or if desired without any starter at all, but as in the other equipments, with an integral reverse gear. The motor is an unusual one in many respects and the catalogue is fully worthy of it.

The Van Blerck Motor Co. has recently issued Bulletin No. 29 which describes the new Van Blerck equipment for making this company's motors operable on kerosene. It is stated that when Van Blercks are fitted with this arrangement, which consists of two separate and distinct carburetors, the one for kerosene being fitted with a hot air connection to a special heater on the exhaust manifold, they operate within 13 per cent. of the efficiency obtained from gasoline while showing an average consumption of 1.02 pints per h.p. hour.

We have received from the C. Z. Kreh Mfg. Co., of Toledo, O., a general catalogue descriptive of this company's many types of motor boat tops. A feature of Kreh tops which is particularly commendable is that each top made conforms to the lines of the boat for which it is intended, being cut from measurements especially for that boat. Another feature of these tops is the easy entrance device whereby one end is lifted up to permit passengers to enter or leave the boat with the least inconvenience.

Among the Clubs

(Continued from page 33)

Baltimore News

The Baltimore Yacht Club is being put in condition for the coming season.

The Junior membership dues have been raised from \$10 to \$20 per year, and the age limit from 25 to 30 years. The increase of new members is about fifty, a great many of whom are boat owners, which will enlarge both their sailing and motor boat fleet.

The club will most likely open about May 15, and has its regular Thursday night dances each week, until closing, which in seasons past have proven most successful.

As usual the club hopes to be well represented on the Chesapeake Bay Racing Association Annual Cruise this season, which will be held the latter part of July.

Dora II Sails Baltimore-Camden Race Over Festive Board

The social time prepared by Captain Bruno Arishoff for his crew of the 400-mile race of last summer from the Maryland Motor Boat Club to the Camden Motor Boat Club, was one of the most successful evenings so far given by the local yachtsmen.

One of the features that gave fun and lots to talk about, was the menu card of twelve feet in length by five feet wide. It had a drawing of the Chesapeake Bay, the outside course on the ocean, from Cape Charles to Cape Henlopen and then the full view of the Delaware River and Bay all the way to the Camden Motor Boat Club at Pyne Point, Camden, N. J. Also pictures of the clubs, lightvessels passed, and courses followed by the racers that covered the full distance.

Many ideas were on the big menu card that had been pulled off by the crew while on their successful run as winners in the big race and these notations were referred to as the dinner party got right down to the good things provided.

"Butt Stew Island" showed on the drawing as a black mark with lots of little dots around it and

(Continued on page 50)

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BANG New Daisy
Only \$2.75

Good for men or boys. Fires repeatedly. Loads automatically. Easy, smooth action. Metal parts non-rusting. Black walnut stock. Adjustable sights. Guaranteed. Price saves you half. Order direct. Write for special circular.

Montgomery Ward & Co. Dept. G. D. 440
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St. Louis Portland, Ore.

Write house most convenient to you.

If you are getting a new boat or a new engine, and wish to sell the old one, don't have it rotting, or rusting or collecting storage charges—sell it—in the Market Place.

Perhaps you have water-front property suitable for a yacht club, or for individual yachting enthusiasts—the Market Place goes to over 25,000 individuals interested in all things pertaining to the water.



Are You Going to College This Fall?

The Educational Bureau of the Chicago Examiner will gladly supply without charge information and catalogues of the best schools and colleges in the country.

A college woman is at the head of our Bureau. Service cheerfully rendered gratis to any school head or to any individual making application to

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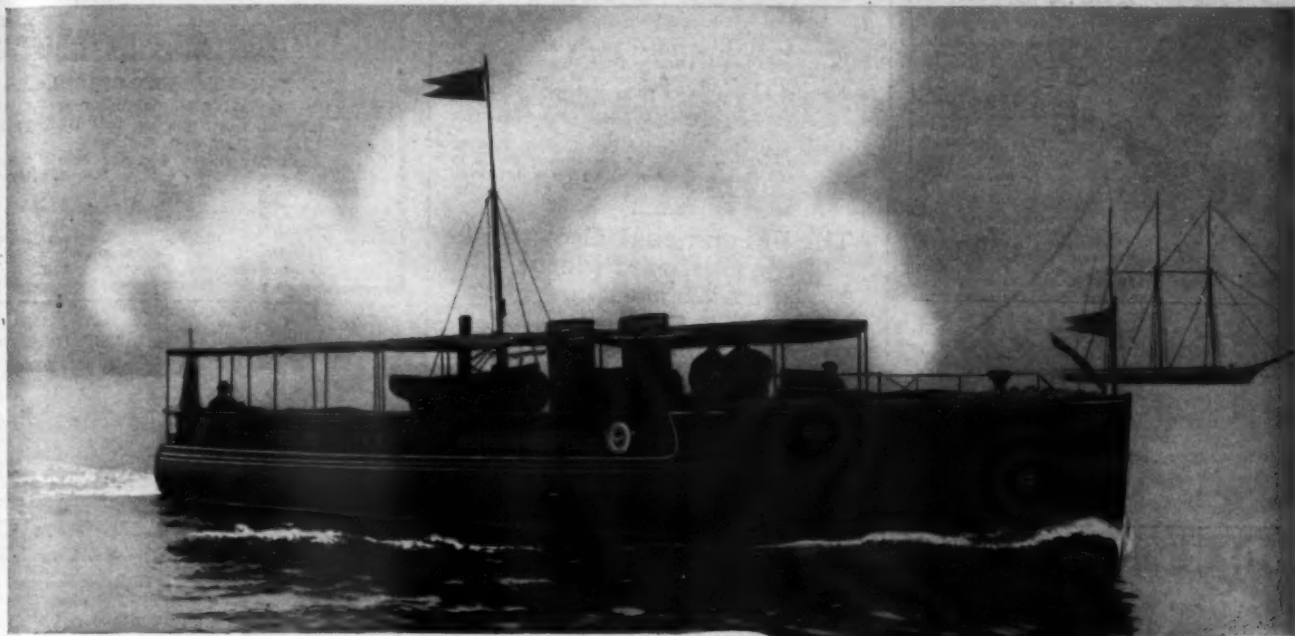
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**"Nothing but the best
was wanted on this
craft . . ."**

SO the Mathis Yacht Building Company used Valspar on the "Lady Baltimore." Read their letter which we reproduce on this page.



Surely if anyone should be possessed of a thorough knowledge of the relative merits of varnishes, it is the boat builder. This letter, coming from a well-known firm that has used Valspar consistently since 1911, should help to substantiate our claims for its all-round superiority.

Ask any prominent boat builder, naval architect or "dyed-in-the-wool" yachtsman for his opinion of Valspar. See whether he doesn't consider it a *positively* waterproof varnish that will not turn white in water.

Upon receipt of 10 cents in stamps to cover cost of mailing, we will send you a liberal sample so that you may test Valspar and be as sure as we are that it is *absolutely* waterproof.

MATHIS YACHT BUILDING COMPANY
Camden, N. J.

October 25, 1915

VALENTINE & COMPANY,
456 Fourth Avenue,
New York.

Gentlemen:

It gives us pleasure to inform you that we have used VALSPAR throughout on the Lady Baltimore.

Nothing but the best was wanted on this craft, and therefore there was no hesitation on our part in recommending and having used VALSPAR as a varnish on this boat.

We did not depart from our regular procedure in recommending VALSPAR for the Lady Baltimore, as we have used it consistently since 1911, and consider it the best all-around, durable marine varnish on the market, and is one that is absolutely waterproof and never turns white.

Very truly yours,
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(Signed) John Trumpy,
Vice Pres.

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IMPROVED THERMEX SILENCER
Increases Revolutions,
No Back Pressure!



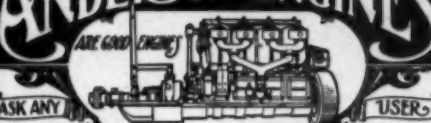
Cannot clog, nor collect salt; water cannot flow back to cylinder. No heating, no odor. Used free or under water—adjustable discharge. Lightest, cheapest to install. Free booklet shows why. Send for it to-day.

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First thing the yachtsman thinks of when he needs a tender is a "Davis Dink." Light, strong and serviceable. Both row and power in stock. Sizes 8 ft. to 16 ft. Our 8 ft. row weighs 65 lbs. Send for Catalog.
The Davis Boat Works Co., Washington St., Sandusky, O.

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WITH DETACHABLE MOTOR
An ideal outfit for hunter, fisherman, or pleasure seeker—making distant places really accessible. Built on same lines as our regular canoes, but with reinforced construction to permit more strenuous service. Our Free Book tells all about Kennebec Canoes for motorists, paddling or sailing. Write today for our free book. Address: **KENNEBEC CANOE CO., 55 N. H. St., Waterville, Me.**



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Gasoline, Kerosene, Distillate or Alcohol
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3 to 40 H. P.
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Combination Underwater - Atmospheric Exhaust System will be your final choice; save money by making it your next choice.



The Most Efficient Silencer Made
Complies with laws. Silences exhaust without loss of power or speed. No back pressure. Reduces vibration, increasing life of engine. No heat. Prevents fires. No clogging. Water cannot flow back to cylinders. Small in size. Light weight. Requires less and smaller piping. Easy to install.

No.	Net Price	Two-Cycle Engine	Four-Cycle Engine
583	\$5.00	3 1/2" x 3 1/2"	3 1/2" x 4 1/2"
585	\$5.50	4" x 4 1/2"	4" x 5"
704	\$10.00	4 1/2" x 5"	5" x 5"
706	\$11.00	5" x 5"	5" x 6"
712	\$12.50	5 1/2" x 5 1/2"	7 1/2" x 9"

Write for other engines on application. Write for circular.
TRACY-STILL MFG. CO., Patchogue, N. Y.
New York City, 1328 Broadway

Among the Clubs

(Continued from page 48)

Charlie Shaw certainly did explain how a butt stew was gotten together.

Commodore Charles Walber gave a description of the storm and how it sent the Dora on and on to victory. Then John Henry Stein, the quartermaster took charge of the cruiser and sailed her over again, that sixty-four miles where good weathering had to be done to get the big lightship, "Penwicks" over the bow and reach there first.

It was said after the party that Captain Arishoff set off just the same number of cigarettes as he did in the race and that Doc Street called for a L-L even more times than in the race.

The Phenomenal Growth of the Outboard Motor

(Continued from page 12)

Ferro

The Ferro is a sturdy, dependable outboard motor that can be readily attached to any rowboat, canoe, dinghy or dugout. It was designed by the Ferro Machine & Foundry Co., of Cleveland, O., to make possible the delights of motor boating without the expense attached to owning an inboard motor. It is made up to the high standard of other Ferro motors, and is designed to operate easily and steadily, with a minimum of noise and vibration. Castings of gray iron are used for the cylinder, piston and piston rings, and the steel of the crankshaft has been given particular attention. The Ferro is equipped with a Bosch magneto, which is gear-driven, and a Kingston float-feed carburetor is used. The boat steers readily, as the propeller works in conjunction with the rudder. Lubrication is easily and thoroughly taken care of by mixing oil with the gasoline for the crankshaft, piston, connecting rod, driveshaft, etc., while the upper main bearing is lubricated by a grease cup. The propeller gears and shaft are packed with grease and require only occasional attention.

Spinaway

The Spinaway Boat Motor Co., of Freeport, Ill., manufactures a two-cycle detachable rowboat motor which is stated to have a great many desirable features. The most prominent of these are the quiet underwater exhaust, the disappearing crank handle and the self-locking tiller. Another lies in the shape of the gasoline tank, which is installed directly under the flywheel and, being circular, does not increase the dimensions of the motor. The Bosch high-tension magneto with which the Spinaway is equipped is mounted on top of the cylinder casting, with only a short length of wire leading to the spark plug. The motor develops 3 h.p. at a normal speed of 900 r.p.m. and has a cylinder measuring 2 1/4-inch bore and stroke.

Wisconsin

The Wisconsin Machinery & Mfg. Co., of Milwaukee, Wis., which for fifteen years has specialized in the production of marine and detachable rowboat motors, has added three models to its 1916 line. Model M, which is equipped with a high tension magneto, is shown in the accompanying illustration. The bracket by which a Wisconsin motor is attached to a rowboat is so constructed that any degree of adjustment can easily and quickly be obtained through a patented method which requires merely the loosening of one nut.

The gear housing is made of phosphor bronze, and has a skeg for the protection of the propeller wheel and for the purpose of cutting weeds. The Model M has a propeller 9 1/2 inches in diameter with a pitch of 13 inches. The rudder is so mounted that it is operated independently of the propeller. Simplicity of design is a noteworthy Wisconsin feature, and the weight has been restricted to 39 pounds. Fittings are for fresh or salt water use.

Gasoline in Abundance Possible

(Continued from page 14)

extent if the hydrocarbons are allowed to reach their boiling point and pass off in vapor. It therefore becomes apparent that they must be subjected to a decomposing heat without allowing them to vaporize, and this is done by increasing the pressure in the still. Everyone who has studied physics knows that water which is brought to a boil and allowed to cool slightly will boil again if placed in a covered receptacle from which the air is afterwards extracted. This is owing to the decrease in pressure of the air in the container. Similarly the boiling point of water or of any other liquid will be raised if the pressure is more than normal.

Remembering this principle, therefore, it can be readily understood that if the pressure in the still is raised to four or five times that of the atmosphere, as is done in the Burton process, the heavier hydrocarbons will be prevented from vaporizing and will remain in the liquid state subject to the partial alteration of their chemical composition provoked by the application of continued heat. This dissociation may be regulated by the degrees of heat and pressure to which the contents of the still are subjected, and on this regulation depends the quality of the distilled products, certain combinations of heat and pressure so altering the heavier molecules as to increase the yield of gasoline, and certain others giving the most favorable results when kerosene, benzene, toluene, etc., are the desired products. It is important in the cracking process to keep the pressure from becoming too high, as this will tend towards total decomposition of the molecules, releasing permanent gases which cannot be condensed for use as commercial liquids.

Taking these things into consideration it becomes evident that the object of cracking is so to alter the heavier molecules that low-boiling hydrocarbons (gasoline, etc.), not appearing in ordinary distillation will be produced; and that successful cracking is accomplished by long exposure to a degree of heat below the boiling point of a particular hydrocarbon, involving a partial alteration or dissociation of the molecules as distinguished from total alteration or decomposition. The Burton process employs a large retort or still for cracking the heavier hydrocarbons, the initial material being placed in the retort and subjected to

(Continued on page 58)

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GREAT FUN

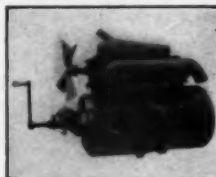
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Saves half on all outdoor outfits. Sturdy, graceful canoes; reliable boats, paddles, etc.

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Ft. Worth Portland, Ore.
Write house most convenient to you



BARGAINS

NEW MOTORS \$95.00

35 H.P., 4 1/4 x 5; 4-cylinder, 4-cycle. Water cooled with pump. Cylinders cast in bloc. High class. Fully guaranteed. Most efficient for motor boats. Closing out job lot. Schmitz Bros., Cor. Station and Collins, East End, Pittsburgh, Pa.

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Designers and Builders of Boats for Pleasure, Speed and Commercial Purposes.

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A Large Line V Bottoms

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KENNEY FEATHER-WEIGHT Silencer
Absolutely indestructible. Copper shell. No odor or back pressure. Silences guaranteed or money refunded. Write today for price.
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Guarantee Speed, Strength, Control. Catalog Free
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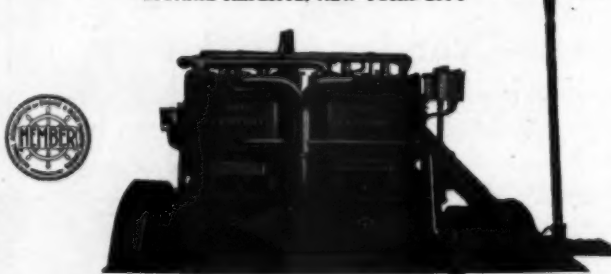
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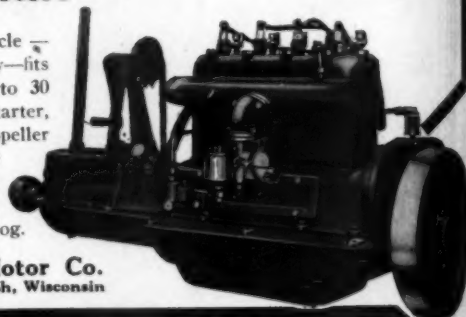
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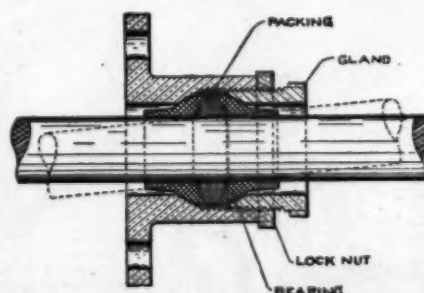
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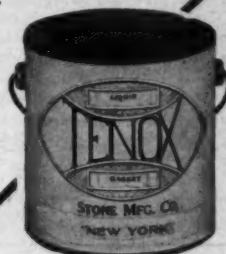
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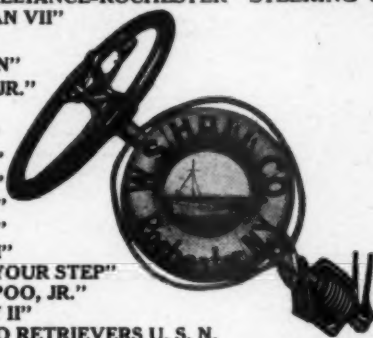
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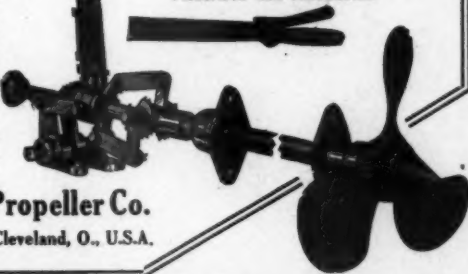
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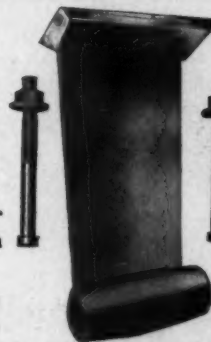
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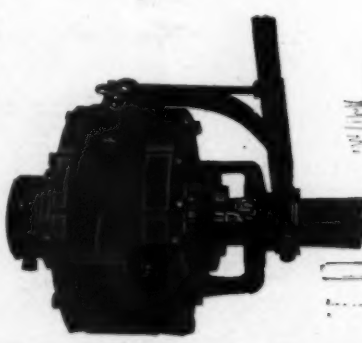
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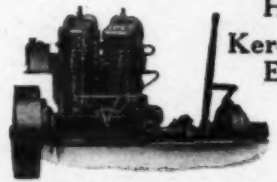
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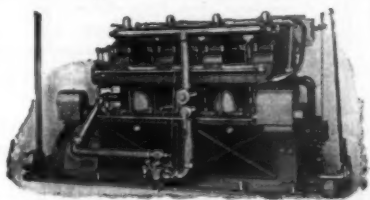
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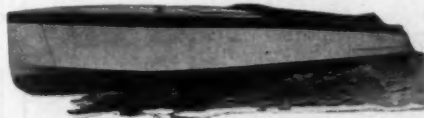
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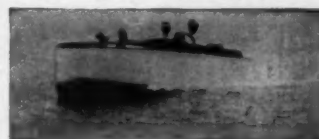
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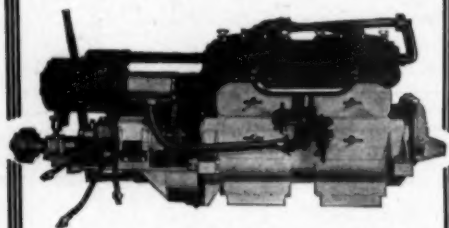
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Gasoline in Abundance Possible

(Continued from page 50)

a pressure of four to five atmospheres and a temperature of 650 to 800 degrees Fahrenheit. This process is strictly limited to use with distillates of petroleum having a boiling point of 500 degrees Fahrenheit or above. Hence it may not be used with crude petroleum and it is also useless with tar oils, asphalt oils, residuum, etc. Right here is an essential difference in favor of the newly invented Rittman process, for the latter may be used successfully with kerosene, gas oil, fuel oil, residuum and in fact any petroleum or product of petroleum capable of being pumped through the tubes by which the plant is fed. It thus opens up vast possibilities which have never before been embraced and does it in a two-fold manner, for the Burton process is privately controlled while the patents on the Rittman process have been assigned to the Government and by it made available to any corporation or individual desiring to operate under them.

Not only may gasoline be extracted by this process from any of the heavier hydrocarbons, but the yield is greater than by any other method. In straight distillation from 15 to 25 per cent. gasoline may be obtained from a good, refinable crude, and this yield may be increased by the Burton process of cracking to 30 to 45 per cent. By the newer system, however, anywhere from 60 to 75 per cent. of gasoline may be obtained from a crude of identical quantity and quality, and Dr. Rittman has recently stated that he is able to extract a 40 per cent. gasoline cut from inferior Mexican crude, which under ordinary distillation yields only 1 per cent. of motor fuel.

Another vital difference between the two systems lies in the fact that the type of still invented by Burton does not permit a continuous operation, while Dr. Rittman's process does. Fresh material being supplied as rapidly as room is made for it by the passing off of the products of distillation. The greatest difference between them, however, is that the oil is cracked in the Burton process when in a liquid state, while the use of suitable tubes and feeding apparatus permits Dr. Rittman to crack it after it has been vaporized. This, together with a feature in the design of the plant which permits the vapors to be recirculated through the system until they are entirely dissociated, is responsible for the increased yield of gasoline from the newer process.

Taking up the system in detail it will be observed from the diagram on page 14 that it comprises a pump for forcing the crude through the plant; a heat exchange, as it is called, for receiving the crude and heating it and also for receiving the hot vapors which at the first operation are not given off to the condensers; and a cracking element.

Following the arrows and letters in the illustration we find that the oil is pumped through the small-diameter tubes A through suitable meters and pressure gauges to the heat exchanges which are large tubes lined with asbestos, fire brick or some other porous material. The area to which the incoming oil is exposed is so great that the latter is instantly heated and passes down through the tubes B into the cracking tubes wherein a constant heat of 1,100 degrees Fahrenheit with a pressure of 150 pounds to the square inch is maintained (if gasoline be the desired product). These tubes are of cast steel with walls at least an inch thick but varying in diameter from eight to eighteen inches according to the size of the plant. The pressure of 150 pounds which is kept constant throughout the whole process combined with the heat, cracks the vapors and they, together with such hydrocarbons as remain in the liquid state, pass downward through the tubes C. Upon reaching the bottom the heavy substances drop into the tar pots indicated by curved arrows, while the vapors rise through the tubes D to the heat exchange.

Here the comparatively cool incoming oils on their downward way to the cracking tubes may carry along a portion of the vapor, but the lighter vapors continue upwards and, passing out of the heat exchange, are condensed into gasoline. The vapor carried down by the oil is again subjected to the cracking process, being recirculated through the system until the ultimate amount of gasoline has been extracted from it.

In the Shops With a Marine Motor

(Continued from page 27)

Now for the drop forgings. These include the crankshaft, the camshafts, and sometimes the gears, although the last are usually castings. Like the castings they are made outside of the engine maker's shop, because bulky and expensive machines are required for their production. The term drop forging is fairly well known to all motor boatmen, but no harm will be done by briefly defining the process. Before a crankshaft can be made, the smithing firm must prepare dies from the patterns furnished by the engine builder. These dies are in two parts, known as the upper and lower halves, and are cut to the exact dimensions which the finished crankshaft is expected to assume. They are very expensive to make and this explains why an engine owner cannot procure a new crankshaft for less than a good round sum.

The steel billet (chrome nickel, carbon, vanadium and other steel alloys which will give the required tensile strength are used) is brought to a white heat and is put in place on the lower half of the die which is locked under the drop hammer. The upper half is then clamped over it and the mechanical hammer, capable of exerting many thousand pounds of effort, is set in operation, forcing the work into the upper and lower halves of the die. To permit the two parts of the die to come together the excess metal which is forced out in the moulding process is mechanically cut away, and in a short space of time the operation is completed and the finished shaft is lifted out. It is then heat-treated and shipped to the engine builder who polishes it up to micrometer measurements.

The same methods, of course, are used with the other shafting, although in most motors the cams are made separately and keyed to the camshaft. The gear blanks are cut for whatever pitch is desired by a gear shaper which cuts the teeth as if the stock were composed of papier mache. Small parts such as wrist pins are turned up on the lathe and are kept in stock for requisition when the motor is to be assembled.

The assembly of the motor is an important process and must be done carefully by men who know their business. Generally, minor assemblies are made and the parts put back in stock to save inconvenience when

(Continued on page 60)

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This clock has a polished brass case, 8-Day Jeweled Movement. The mahogany base can be removed when clock is hung in yacht cabin. Clock with base makes a fine mantel clock. Send for Catalog 8.

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for circulating purposes are the very best. Hundreds of Thousands in use. Send for Catalogue.

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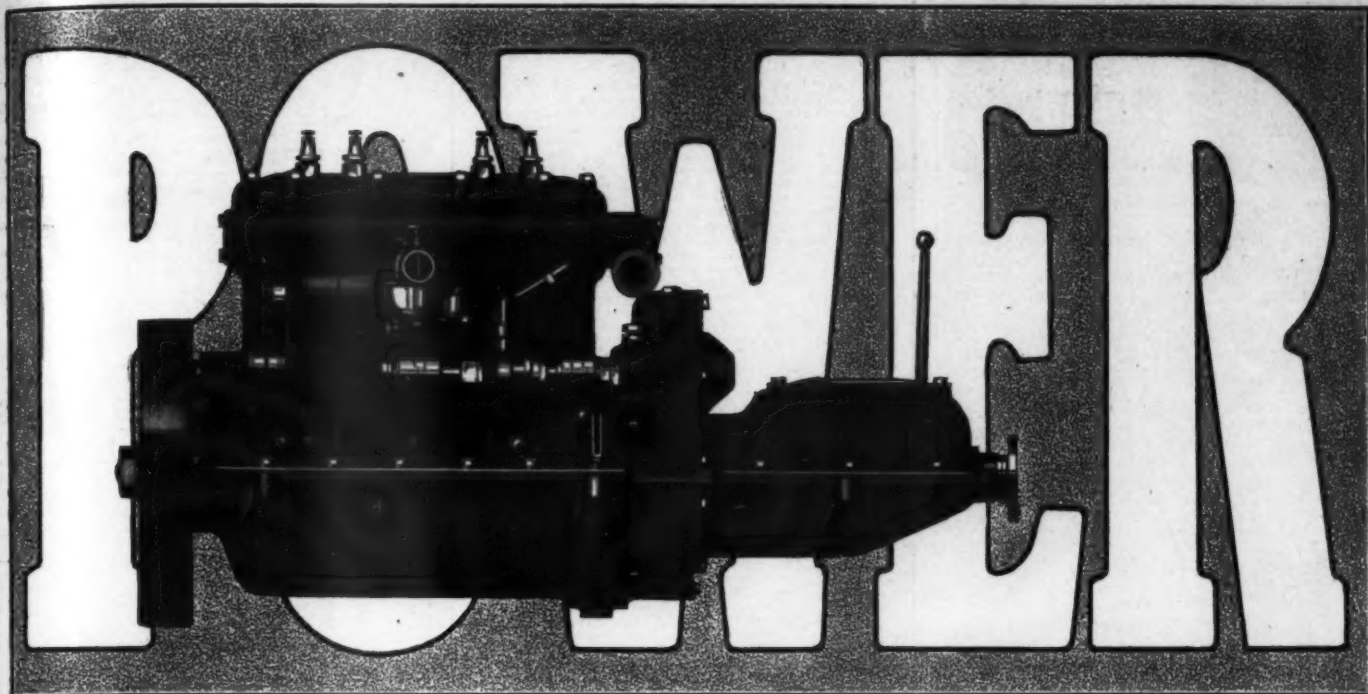
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The “D Junior” is unquestionably the highest achievement in four-cycle marine motor design—the most powerful little brute of a 4-cycle engine

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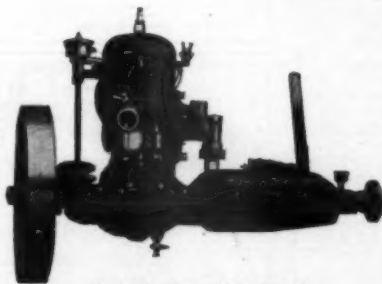
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The “D Junior” shows more power per cubic inch of piston displacement than ever before attained—and with it all, quality of a new degree;

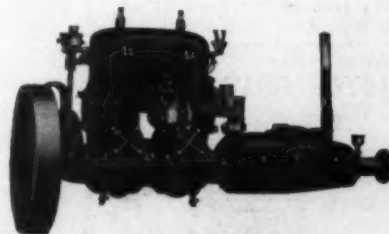
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Complete
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WISCONSIN ROW BOAT MOTORS were awarded the only and highest prize at the Panama-Pacific Exposition.

In a recent U. S. Government competition in which many manufacturers participated, the WISCONSIN was given the contract.

Our 15 years of marine motor building experience, and specialization in this field, enabled us to produce row boat motors of the simplest mechanical design, easy to operate and certain of continuous service.

WISCONSIN MOTORS are made for salt as well as fresh water service, hence the parts are of the highest quality.

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STANLEY MARINE MOTOR
High in Quality—Low in Price
THE STANLEY CO.
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Francke Flexible Couplings

remove the friction load from your engine, eliminate vibration, and allow the shaft to turn freely.
At your dealer, or direct from
SMITH SERRELL CO., Inc.
Gen'l Sales Agent for THE FRANCKE CO.,
West St. Bldg., New York City.

FIGURE 1404 IMPROVED MOTOR BOAT CLOSET



The best little closet on the market today, possessing many of the advantages of the large size toilet. All brass and porcelain. Oak seat and cover.

Price.....\$25.00

THE J. H. CURTISS CO. 2 South Street, New York

In the Shops With a Marine Motor

(Continued from page 58)

the motor itself is to be put together. Thus, before a finished cylinder casting is put away in the stock room it is completely fitted with valves, springs, valve caps, and petcocks, while the various component parts of a water pump or oil pump are put together in the same way. Carried on to the floor of the assembly room, the major castings are first lifted by traveling crane and immersed in a washing solution which cuts away any accumulation of grease present, metal shavings and filings having been removed by compressed air in the earlier operations.

Then the crankcase is placed on the blocks and the motor is built up at a speed which would turn the amateur engine tinker green with envy. There are no leftover parts, either.

With the motor completely assembled the next step is the testing. This is a process which varies in length with the size of the motor and also according to the conscientiousness of the engine builder. First of all the motor is "run in," the flywheel being belted up to the shop power shafting and allowed to turn the engine over at a fairly rapid rate for a matter of ten hours, with all spark plugs removed. This important part of the test is for the purpose of working in the bearings which may have been a little tight when the motor was first put together, and it is accompanied by copious oiling of all parts. It saves certain disastrous results when the motor is later turned at full load and speed under its own power.

With a battery of high-powered motors roaring away, a test room is a noisy place, but the men in charge can tune their ears to the individual motors and tell just how each is operating. This test under power may be conducted for two hours or over—sometimes for two days with big expensive jobs of which exceptional service will be expected. The testing is done on the dynamometer or water brake. The reverse gear which may or may not have been manufactured by the engine builder is also subjected to a short test, and the motor is then partially disassembled to see if wear has developed in any parts. If it has, the defective parts are replaced and the motor is subjected to a further test. If, as usually happens, the machine has come through the ordeal unharmed, it is moved to the finishing room where it is scraped, cleaned and painted.

A high class of workmen is required for nearly all of the steps in the production of a marine engine, and so it follows that the work is carried through conscientiously. From the day an apprentice enters a shop it is his ambition to use a pair of micrometers for the measurement of machined articles, and when he has served so many thousand hours and becomes a full-fledged machinist it is his particular delight to start a conversation by saying in an off-hand way, "Well, when I was using 'the mikes' today—"

But even if the workmen did not have a wholesome pride in their handicraft there would be little chance for slipshod work to get by, for each operation is carefully checked up by inspectors.

Thus it is that when your motor comes to you it is accompanied by a grease-smeared ticket checked off by the inspectors of the various departments, and thus it is also that when you install it in your boat, and turn the flywheel or step on the starting pedal, it starts off with a hum and serves you faithfully in season and out.

The Prize Contest

A Safe Oil Lamp

(Continued from page 23)

a position that the valve will be tightly closed when the oil fount is nearly full. A piece of tubing from the reservoir and a tubing union completes the connection. (See detail, page 22.)

On the side of the reservoir solder three rods long enough to reach the bottom of the light and threaded for wing nuts. A flat plate with holes spaced to fit the rods completes the job. Fill up the reservoir and try out the light before taking it aboard the boat. Lights of different styles will require slightly different treatment, but the general idea may be applied to any make of light.

An asbestos wick will not char and will burn more clearly without trimming than a cotton wick. Signal oil or signal oil and kerosene mixed half and half will burn more cleanly and be more satisfactory than kerosene alone. An oil anchor light should be hung by a small line in such a position that should it go wrong the line will burn off and let the light fall overboard. Another line attached to its base will make recovery possible. There is always more or less air current on the water and this light has been designed so that the oil reservoir will be just barely warm when in use. If you are skeptical, a cone of 1-inch mesh wire gauze around the flame will make a miner's lamp of it and the flame will not ignite even gasoline vapor outside the cone.

After considering the constant drain on a storage battery, of even a 2 c.p. lamp, and the possibility of an acetylene tank failing during the week, oil seems the only feasible means of burning a small light seven days without attention.

W. B. MOORES, Newburgh, N. Y.

Cedar Post and Concrete Block

(Continued from page 25)

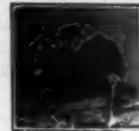
pour the concrete in the mold and let it set for about two weeks, when it will be ready for use. In the meantime, the float or buoy can be made from a cedar post about eight inches in diameter and six or seven feet long, tapered to about five inches in diameter at the upper end. Put the fastening in place and wind the upper end with rope, as shown in the detail, apply several coats of good paint, and, when dry, connect the buoy to the anchor with a 1/2-inch chain about twice as long as the water is deep. This anchor will hold on most any bottom, but best in the mud.

An objection that can be offered against kegs and the like as buoys is that they seem to spring a leak—quite often from a rifle bullet, as they make excellent targets. They also are too low to tie to conveniently from the deck of a cruiser.

A 30-foot boat on ordinary waters should have a 200-pound weight and a 1/2-inch chain, a 40-foot boat a 325-pound weight and a 3/4-inch chain, and a 50-foot boat a 450-pound weight and an 1/2-inch chain, the size of the buoy varying with the size and length of the chain.

It is best to make the buoy a little large and then add some ballast, which may be decreased should the buoy become water-soaked later.

M. A. WEIGHT, St. Paul, Minn.



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"Dandy Jr." Power Tender.
10 ft. x 4 ft., semi-round, 2 1/2 H. P.
Blakely, cedar planked, \$35.00.
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3 H. P. Single Cylinder 35 lbs.
6 H. P. Double Cylinder 55 lbs.
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Aluminum base, copper water-jackets, steel shaft, bronze bearings.

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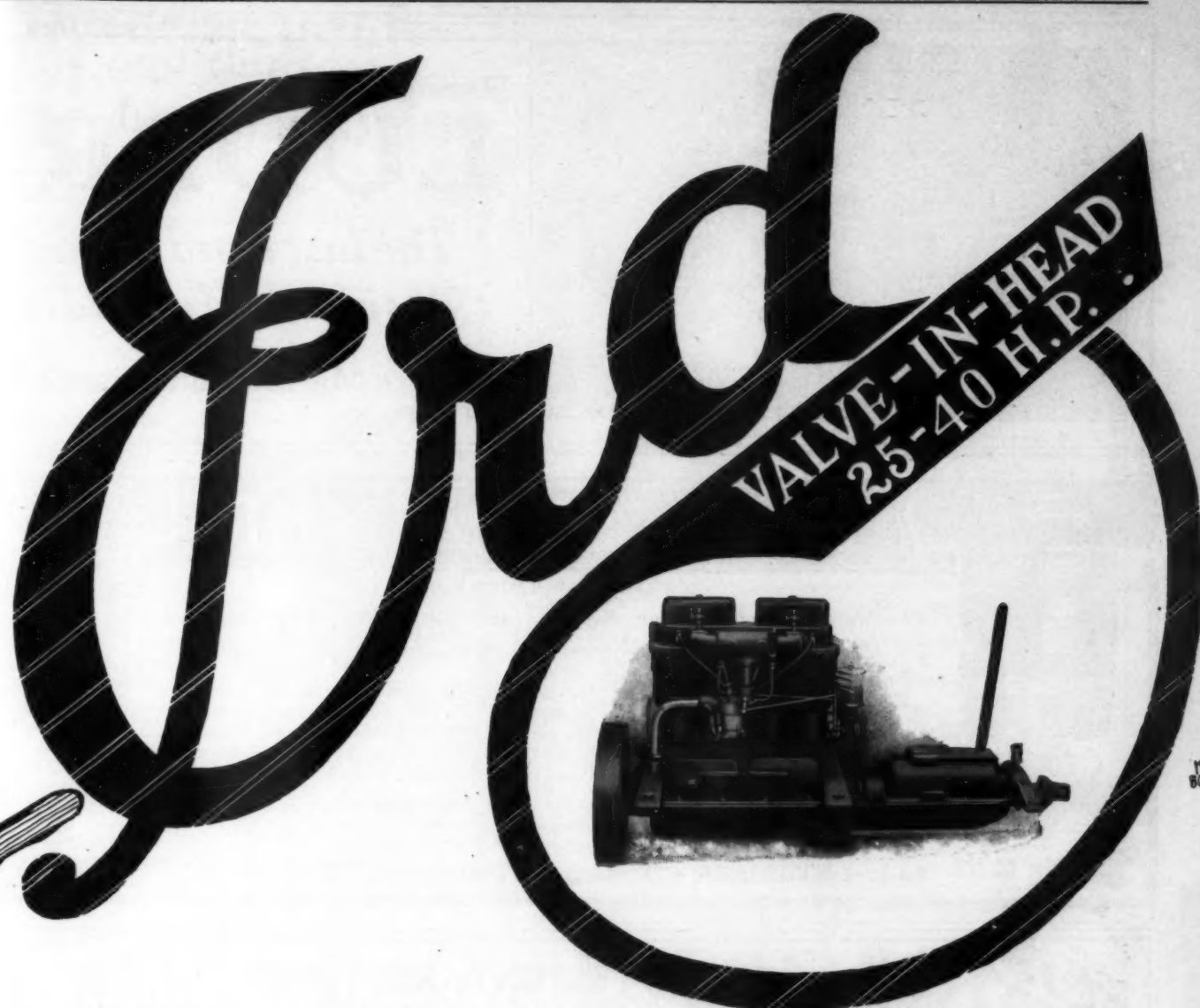
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The greatest and most pleasing warning signal for motor boat or motor car. Warns both Ear and Eye. Absolutely guaranteed. Patent applied for Nov. 5, 1914. Prices, \$3.00 to \$8.50. Write for full particulars.

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**\$460**

Standard Type. Iron base and crank case, for heavy and medium duty work, speed 200 to 900 R.P.M.

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High Speed Type. Aluminum base and crank case, for fast launches and hydroplanes, speed 200 to 1500 R.P.M.

Price includes Magneto, Joe's Reverse Gear and all usual motor equipment

To the undisputed Erd Quality we have added the undisputed superiority of Valve-in-Head design. And by producing these motors in the quantities warranted by the long standing Erd demand we have been able to reduce the manufacturing cost to a point which permits the exceptionally low prices quoted above. If exact figures were obtainable, we believe this particular Erd model would be found the most popular marine motor of its size and type on the market.

We have been building Erd Quality Marine Motors for seventeen years. When we built two-cycle motors exclusively these Erd motors were known to be among the fastest, sturdiest and most satisfactory two-stroke motors made. We still make these two-cycle motors in Standard and Featherweight types, and sell great numbers without even advertising them, so great is the value of their past reputation. Many a race has been won by these Erd motors.

When we introduced our first 4-cycle motors of the L-head type, their clean cut lines, great fuel economy and steady power quickly built up a ready sale for them. Not satisfied to rest on this success we proceeded to adopt and adapt the many advantages of Valve-in-Head construction for these motors. After a season of wide general use we do not see where there is room for improvement. But when we discover such a possibility it will be immediately worked out and offered to our large clientele of Erd patrons.

Tell us about your boat, what speed you want and let us submit a proposition that will interest you.


ERD MOTOR COMPANY, Saginaw, W. S., Michigan, U. S. A.



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*The last word in yacht
design and building*

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"10-in-1 STRAINER"

A CARBURETOR TROUBLE SAVER

The Most Perfect Gasoline, Kerosene and Oil Strainer Ever Designed

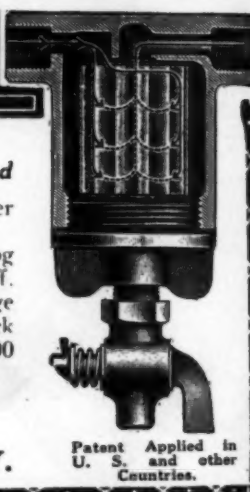
The 10-in-1 Strainer has ten times as large a straining surface as any other strainer of the same pipe size.

On account of its large straining surface it is practically impossible to clog up and the sediment it strains out is kept *settled* at the bottom until drained off, and is *not continually stirred up* by the passing fuel as in other makes. The large straining surface permits the fuel to pass through rapidly. Sediment drain cock at bottom. Strainer easily removed and cleaned. *Retail price, 1/8 or 1/4 inch, \$2.00*

Sold by all leading dealers and supply houses.


Manufacturers send for sample and special quotations
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Medium speed Motor 10 H.P. and 18 H.P., also single and triple cylinder models, 5 to 27 H.P.



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"Paragon Duplex" Lubricator

Motor Boat Whistles, Tubing Unions, Globe, Angle and Check Valves, Bronze Fittings, etc.

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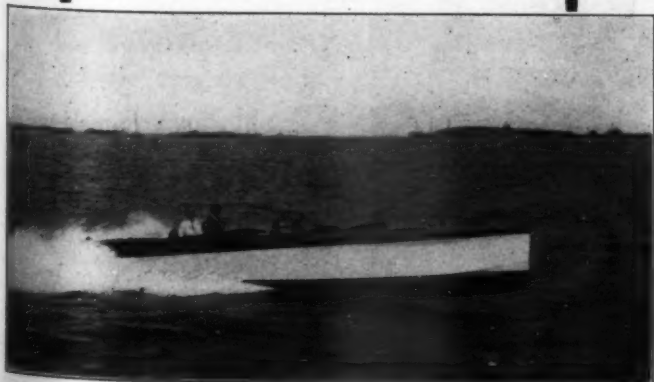
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Established 1866

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With nothing but a monkey wrench you can take up the slack in both ends of the rope with one quick adjustment of the drum. Whether there is half an inch or twenty-eight inches of slack in the rope, TILLERTITE makes it tight instantly.

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10" Size, for thirty-footers and under, Galvanized Malleable, \$6.00

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If you enjoy working with tools and want an open launch, build it with your own hands, starting with one of our K. D. frames. You can build the finest 25 ft. launch from the K. D. frame and equip it with power for less money than you would have to pay for the cheapest 18 ft. launch on the market.

Experience in boat building is entirely unnecessary. We do the boat builder's part.

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We launch from our factory every season some of the finest boats built, and we only ask an opportunity to prove the claims we make.

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size and type of
boat that you are
interested in and
whether you wish
to build from a
K.D. frame or buy
the finished boat.



A Cruiser Frame ready to take apart and crate for shipment.

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Marblehead Anti-Fouling Green or White has a hard, smooth finish, it lasts a long time and it stays clean. It is a powerful wood preservative, saves heavy expense for hauling out, re-painting and repairs, and it covers twice the surface, cutting the first cost in half.

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Whether for semi-speed or high speed work, greater effectiveness can be realized by using a propeller of proper design—not the ordinary types but one that is the result of scientific study and tests—a "Shaw."

The "Shaw" Centripetal Propeller is so designed as to eliminate any centrifugal action of the water particles as they pass through the zone of the propeller's activity—a straight, powerful thrust in the direction of travel results—no counteracting resistance.

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 15 ELKINS STREET BOSTON, MASS.

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4 CYL.	48 H. P.
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Roberts Motors are the speediest, most powerful, most compact and most flexible Motors ever built. They throttle down to 250 R.P.M and jump to 1,000 R.P.M. in an instant with full load. And all you hear is the almost silent hum of a sewing machine. Every Roberts Motor is equipped with our patented Cellular Bypass, that not only prevents backfiring through the carburetor, but thoroughly mixes fuel and air through its hundreds of long, narrow passages into an explosive charge that produces a "wallup" that spells POWER. The Cellular Bypass also enables a "Roberts" to run at its guaranteed horse power on

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The ruby India Mica used as insulation in

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is wrapped around the spindle laterally. Each layer overlaps and the core thus becomes impervious to oil while all chances of short-circuiting through the presence of small metallic substances are eliminated.

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AUTOMATIC
Striking Ship's Bell Clock



(Patented)
Equipped with the
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The “Chelsea” Automatic is so designed that it will strike the big bell forward no matter where the clock may be placed. By a special push button the bell may be rung continuously as in foggy weather. Striking of the bell can be omitted if desired.

There are many features of this clock that are well explained in our catalog, which will be sent to any yachtsman or motor boat owner on request. Write for it today.

Also very many models of Ship's Bell Clocks and non-striking clocks, suitable for use on any size of boat.
Our Auto Clocks, BEST in the WORLD.

On Sale by high class jewelers and dealers in nautical instruments

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Real Economy For Every Engine

A Detroit Mechanical Force Feed Oiler means real economy because it is adjusted by the operator to feed exactly the amount of oil required—no more—no less.

This means a minimum of oil used for perfect results; but the *real economy*—the *big saving* is evidenced in the freedom from repair bills—the greater service and longer life of the machine.

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are the best possible insurance against burned out bearings, scored pistons and cylinders, annoying delays and shut-downs due to faulty lubrication.



They are made in styles and sizes for every kind of gas—gasoline or oil engine, marine stationary or automobile. Equipped with pulley ratchet, gear or sprocket drive for easy installation on any engine.

Catalog P-64 giving full information gladly sent on request.

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DETROIT, U. S. A.

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We are the manufacturers of the well-known Comet Magneto, and there are thousands of them used for ignition and lights on power boats. Sixteen years' experience in magneto building has enabled us to produce the Eureka lighting outfit.

Magnetos for Ignition and Lights
Direct from \$10.00 up.

Lighting Outfits, consisting of
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Write us today for catalog which
gives details of lighting outfits
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Detroit Standard Gear Co.
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and cruisers are used by U. S. Government in Life-Saving and Lighthouse service, by foreign governments, by institutions and individuals everywhere. *Racine^{wis}* is a name backed by twenty-one years of boat building skill. It means speed, power, comfort, safety and dependability in boats.

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MORTON

16
H.P.

4 Cyl.
4 Cycle

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The Powerful Overhead-Valve Motor

If you know good motor engineering when you see it, you will be surprised at the thorough quality we have been able to build into the 1916 Morton Motor at \$150. Not only in the design, but also the materials and workmanship, you will find that only the best of everything has been used. Our long experience in producing vital motor parts for high-grade automobile manufacturers is a guaranty of our ability to produce as good a motor as you want to own.

Overhead Valves	One-Piece Camshaft
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Intake Passage in Cylinder Block	Four-Cylinder, Four-Cycle

If you have a fast launch or runabout, hydroplane, or cruiser, write today for full information on the 1916 Morton Motor.

MORTON MOTOR COMPANY, 46 East Lafayette Ave. DETROIT, MICH.

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22 Foot Fauber Hydro Runabout

These are two selections from our complete line of "VALLEY" Boats. The one is our 21 foot mahogany runabout which makes a speed of from two to 21 miles per hour with a 20 H.P. motor. It is especially equipped for comfort and ease of handling. Capacity, six persons.

The boat at the right is a special 22 foot, 5-passenger Fauber Hydroplane with a speed of over 35 miles per hour. It is very staunch and seaworthy and makes an ideal speed runabout for use in the warm summer months.

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OBERDORFER BRONZE GEARED PUMP

If your engine has a tendency to overheat, discard your old leaking, weak-hearted pump and replace it with the positive Oberdorfer Bronze Geared Pump. The cost is so little that you will get your money back ten times over, in increased engine service, decreased repair bills, lower fuel and oil consumption.

Oberdorfer Pumps are made especially for marine motors. They are standard equipment on many well known makes, such as Erd, Red Wing, Scripps, Smalley, Loew-Victor, Gray, Fairbanks-Morse, Mohawk, Lamb and others. They can be installed readily on practically every model of marine motor now in use.



Three outstanding features are responsible for the rapid growth of Oberdorfer popularity. 1st, they distribute water in exact proportion to the engine speed; 2nd, They give a positive pressure always, even at the lowest speeds; 3rd, they lift water three feet without priming, which is especially important if engine is installed above water line.

Write today for the Oberdorfer Book. It gives prices and shows the different models and capacities.

M. L. Oberdorfer Brass Co.
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Why Don't You Have a Gies Reverse Gear in Your Boat?

Gies Gears are made in various sizes of open and enclosed type suitable for all marine motors up to 40 H.P. at 1000 R.P.M. The prices are so low that you will be surprised how little the model you want will cost you.

Large demand, ready sale and consequent quantity production has cut our cost per gear to the minimum. There are over 30,000 Gies Gears in use, making new friends and customers for us every day. We give our patrons the benefit of Gies popularity by making our prices as low as possible.

Our Gears are honestly made, with the best of materials and workmanship. They have fewer working parts than any other gear. All parts are interchangeable, so you can replace any part at slight expense and make the gear as good as new after years of service.



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They should be—if you value the comfort and pleasure which come with dependability and safety. Most good boats carry "NORMA"-equipped magnetos, lighting generators and starting motors.

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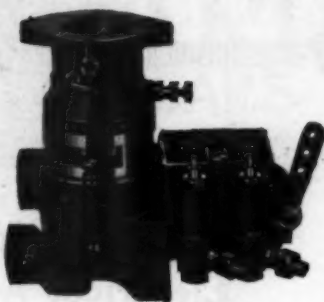
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B

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If you own a gasolene engine of any type—

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The H & N Duplex Kerosene Carburetor

will save you at least 66 per cent. of your fuel bill. Gasolene, 30 cts. a gallon. Kerosene, 10 cents a gallon. Equally efficient on Kerosene or Gasolene.

The average consumption of a gasolene or kerosene engine is one pint per horsepower per hour.

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A 50 h. p. engine consumes 62½ gallons in 10 hours.
62½ gallons of gasolene at 30 cents per gallon is \$18.75
62½ gallons of kerosene at 10 cents per gallon is 6.25
Saving per day \$12.50
or \$3,750 per year of 300 working days.

This size carburetor will cost installed less than \$75. The same proportionate saving can be shown on your engine. Sold under positive guarantee of satisfaction or money back.

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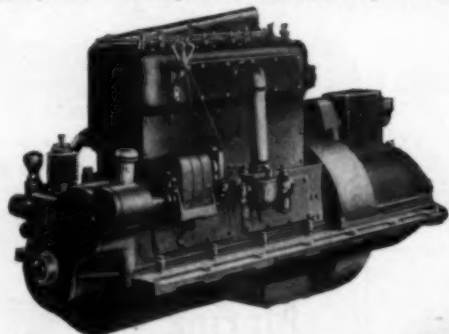


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Simple, Durable, Economical, Efficient



THE best designed four-cycle engine made. Strictly high-grade, modern throughout. Bosch ignition and Bosch electric lighting and starting system supplied. Furnished for burning kerosene, distillate or other low grade fuels, if so specified in order.

We manufacture the largest variety of four-cycle motors, covering fifteen different sizes and models, both medium and heavy duty, for the small runabout or the heavy sea-going cruiser.

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Miller Portable Motor

with positive reversible propeller.

Bore 2¼", stroke 2¼", capacity 2¼ H.P., equipped with either Bosch or Dixie high tension magneto, also battery. Absolutely reliable and highly efficient.

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MORRISTOWN Marine Motors

The Highest Quality Motor
of Its Size and Price
Made in America

That is a pretty strong statement, we admit, but we have the courage of our convictions and invite the most searching investigation, and comparison with any other motor of similar power, regardless of price.

Look at the brief list of features. The many others which we haven't room to mention, including quality of materials and workmanship, you will find equally satisfactory. Light enough for a hydroplane, fast enough for an express runabout, powerful enough for a cruiser.

Weight, 625 lbs., complete; aluminum crank case; heavy crank shaft; heavy flywheel; large bearings throughout; die cast nickel babbitt bearings with laminated shims; manganese bronze connecting rods; one-piece cam shaft, easily removed; high tension dual magnets; rotary gear water pump; constant level splash lubrication with gear oil pump; Joe's reverse gear on base; rear starter; Schenker carburetor; many other features.

Write today for complete description.
Two Cycle Motors 4 to 15 H. P.

Morristown Boat & Engine Works
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Wireless Telegraph Equipments for Motor Boats

Necessary As a Telephone At Home

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We have perfected a *thoroughly practical* Wireless Equipment for power boats of all sizes. It is powerful enough to transmit messages 1,000 miles, or receive 5,000 miles. This is not a toy, but a complete and powerful apparatus adequate for the requirements of all pleasure boats.

Write today for full information. Tell us the size of your boat and let us tell you what equipment you should have.

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25 FOOT CABIN CRUISER

THE arrangement of this raised deck cruiser is very comfortable and convenient, it is able and seaworthy in heavy weather and it has an actual speed of $9\frac{1}{2}$ to 10 miles per hour. There is a roomy cockpit aft, a comfortable cabin with 6-foot transoms, ice-chest, dish lockers, clothes lockers, drawers, and a separate toilet room forward. The construction is strong, the workmanship and finish of the highest class. The utmost care is taken with the engine installation. Perfect ventilation and freedom from noise, dirt and vibration are noteworthy features. The engine is completely out of the way, but instantly accessible either from the cabin or the cockpit.

STEARNS & MCKAY CO.
MARBLEHEAD MASS
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Supreme Auto Oil

is scientifically refined from selected high-grade crude oil under the supervision of skilled chemists. It measures up to the requirements of any and all the lubricating systems, giving efficient lubrication at a low mileage cost. Its high viscosity renders it a perfect warm-weather oil, and its low cold test an Ideal Winter Oil, as it Flows Freely at Zero.

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Outboard Motor Owners

You saved a lot when you quit rowing but still there are many things about a rowboat that aren't all pleasure—the vibration of the motor; the sitting still lest you tip over; the uncomfortable seats; the lack of room; the waves splashing in when the water is rough.

You can get a boat that will go faster; seat seven comfortably, 5 on cushions; resist reasonably heavy seas; give you perfect safety no matter if three men sit on side combing; room to sleep under forward deck; that you can pull out of the water alone and that looks, acts, and rides like a launch.

Write for Circular C-1-B

DEERING BOAT MFG. COMPANY
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BATH rooms on boats should be just as complete, satisfactory, and inviting as the modern bath room in our homes, apartments, and hotels.

In the best marine installations the bath rooms are replicas of those found in the best hotels and residences—cleanly, beautiful and enjoyable.

Where circumstances require special marine fixtures, Mott's Marine Plumbing offers many advantages in design, quality and price.

Mott's Plumbing has been installed not only in all the finest yachts afloat to-day; but also in representative hotels, residences, and other building throughout the country.

We invite your correspondence with a view of supplying information relating directly to any requirements you may mention.

1828 The J. L. Mott Iron Works 1916
Fifth Avenue and 17th Street New York

More Pleasure From Your Motor Boat

You practically double the pleasure of motor boating when you have the same perfect control over your engine as the automobile driver enjoys.

There's a world of satisfaction in being able to stop, reverse, or go ahead instantly as desired—in knowing that your boat is under perfect control at all times. And then when you get in a tight place—when there is danger of accident—your reverse gear, if it is the reliable kind, is a priceless addition to your outfit.

Baldrige Reverse Gear

Baldrige reliability has been proven by years of service. It has but one main shaft, extending from bearing to bearing—it cannot possibly sag, wobble or get out of alignment.

The Baldrige "idles" perfectly. It carries far greater overload than its rated capacity. Gears are completely enclosed and perfectly lubricated.

Double expansion clutches with reinforced reverse bands—gears heat treated and hardened by scientific modern methods.

Get the Baldrige Book today—you owe it to your motor boat.

BALDRIDGE GEAR COMPANY
238 Mt. Elliott Ave. Detroit, Mich.

"The
Gear
with the
unbroken
Main
Shaft"

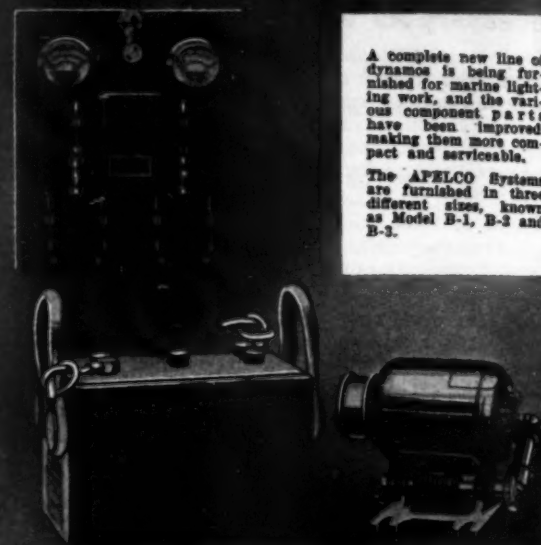


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APELCO

MOTOR OR BOAT
ELECTRIC LIGHTING SYSTEMS



A complete new line of dynamos is being furnished for marine lighting work, and the various component parts have been improved, making them more compact and serviceable. The APELCO Systems are furnished in three different sizes, known as Model B-1, B-2 and B-3.

APELCO B-3 Motorboat Electric Lighting System
APELCO STARTING UNITS, suitable for certain motors, can be supplied. If writing for information, send with your letter bore and stroke, h.p., r.p.m. and number of cylinders of motor for which starting unit is intended.

THE APPLE ELECTRIC COMPANY
Factory, NEWARK, N. J., U. S. A.

G. B. C. & CO.

*This is the signal to
flash when you need
anything in*

**MARINE HARDWARE
MOTOR BOAT SUPPLIES
YACHT SAILS
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GOODS**

*Try it and see how quickly
and satisfactorily you will
get action. Catalog for 20c
in stamps; refunded on your
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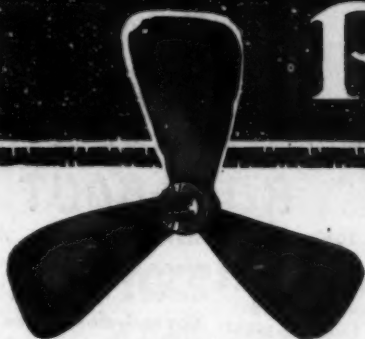
GEO. B. CARPENTER & CO.

430 Wells St., CHICAGO



Stop Wasting Gasoline-Get A

B & B



Propeller

There is no use kicking at the high price of gasoline if you are willing to let your boat chug along with a propeller that only utilizes a part of the driving power which the engine delivers. A brand new engine and ten cent gasoline couldn't be economical if handicapped with a slipping wheel.

The more experienced a boat owner is, the more exacting he is about the efficiency of his outfit. And nowhere is efficiency more essential than in the propeller. Just because it is out of sight the propeller is often forgotten, when as a matter of fact it is the real source of inefficiency.

More Speed Guaranteed—We Take the Risk

For years we have had a standing guarantee to increase the speed of any boat 1 to 3 Miles an Hour. We are willing to take the risk of proving that you need a Bryant & Berry Propeller. If it doesn't give you this increase, of course, you don't want it, and it is only fair for us to take the chance.

We have built up a tremendous business on the B & B Wheel, backed up by the B & B Guarantee—one of

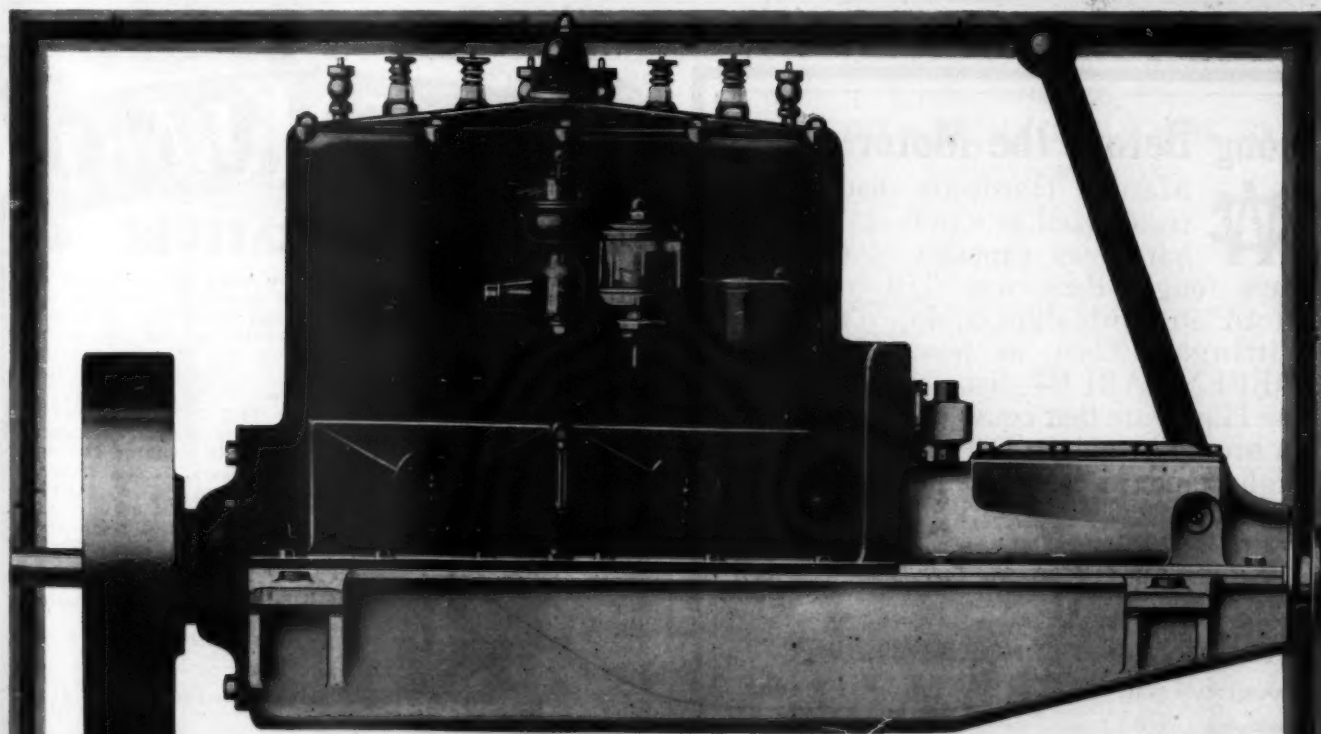
the largest of its kind in the world. Write us today, giving full information about your boat—size, engine, power, revolutions, service and speed, and type of construction. We also make launch fittings, etc. Ask for complete catalog.

Look for our name stamped on the hub of every genuine B & B Propeller.

BRYANT & BERRY CO., 32-36 W. Atwater Street, DETROIT, MICH.

EASTERN REPRESENTATIVES: E. J. Willis Co., 85 Chambers St., New York, N. Y.
CANADIAN SALES AGENTS: Canadian Fairbanks-Morse Co.

WASHINGTON AND ALASKA DISTRIBUTORS: S. V. B. Miller, Seattle, Wash.
SOUTHERN REPRESENTATIVE: Woodward Wight & Co., New Orleans, La.



Type Q-M—4-Cylinder—4-Cycle. Bore 3 1/4"—Stroke 5"

Wisconsin
CONSISTENT

Before you buy that motor, write for specifications of Wisconsin Motors of type and size you desire. Four, six and eight cylinders—many types.

WISCONSIN MOTOR MFG. CO.
Sta. A—Dept. 302 MILWAUKEE, WIS

New York Branch, 50 Church St.
T. M. Fenner, Factory Representative
Pacific Coast Distributors:
Earl P. Cooper, 1428 Bush Street, San Francisco, Cal.



What You Get When You Buy A NIAGARA RUNABOUT

YOU get every quality you could wish for, a high-class, seaworthy, fast, luxurious and comfortable express runabout—at a price you cannot match elsewhere. Quality is not sacrificed to economy, comfort is not sacrificed to speed. All these features are balanced and blended into the kind of a boat you have always wanted to own.

There is no exact parallel for the Niagara idea in the People do not buy Niagara Runabouts merely to save money. They buy them because the Niagara models satisfy their demands in every detail, and relieve them of the bother, delay and high cost of built-to-order boats. This statement is proved by the fact that many Niagara boats have been purchased by owners with unlimited means. The saving is incidental.

PRICES FOR IMMEDIATE DELIVERY

20' x 4'6" with 10-12 H.P. motor	\$1,300
25' x 5' with 20-24 H.P. motor	1,600
28' x 5'6" with 15-28 H.P. motor	2,400
28' x 5'6" with 20-35 H.P. motor	2,600
32' x 5'6" with 20-35 H.P. motor	2,700
32' x 5'6" with 30-45 H.P. motor	2,900

Write today for full information

Niagara Motor Boat Co.
210 Sweeney St., N. Tonawanda, N. Y.



Long Before the Motor Boat

W Marine Hardware had been recognized as standard. Many hardy sea captains of the old days fought their way "Round the Horn" in sturdy ships equipped with **W** Fittings. Then, as now, **W** meant **DEPENDABLE**—distinguished Marine Hardware that could be relied upon in breeze or gale. The same high standard is maintained to-day.

GET THIS VALUABLE ILLUSTRATED BOOK—112 pages. Contains facts about Anchoring, Moorings, Compasses, etc., that every boatman wants to know. More than a mere catalog. Sent for 10c—write now.

WILCOX, CRITTENDEN & CO., Inc.
ESTABLISHED 1847

4 SOUTH MAIN STREET, MIDDLETOWN, CONN.
World's Largest Manufacturers of Marine Hardware
Manufacturers of the Famous Maxim Silencer for Motor Boats



**Oil
Compass**

Carefully made and adjusted—fully guaranteed. Dials from 2 to 5 inches. "Compass Talk & Tests" free.



WICKER-KRAFT YACHT FURNITURE

For the better class of pleasure boats the suitability of the interior furnishings is fully as important a detail as the power equipment or the general plan of the boat. It is just as essential to the owner's pleasure, comfort and pride. And the difference in cost between the ordinary and the genuine Wicker-Kraft is so slight that there can be no reason for going without the best.

WICKER-KRAFT IS USED ON THE FINEST BOATS.

We are proud to number among our regular customers such well-known builders of high quality boats as Lawley, Seabury, Luders, Elco, St. Louis, Niagara, Fay & Bowen, Matthews, and many others of the same class. A list of the boats furnished with Wicker-Kraft would include many of the best known motor boats and finest yachts in America.



See Life Belt in Place

Wicker-Kraft Furniture is the correct thing for all sizes and types of pleasure boats. We have special designs for canoes, row-boats, express runabouts, launches, day cruisers and cabin cruisers.

The popular idea of enclosing a life preserver under the seat of the chair is an original Wicker-Kraft feature. All genuine Wicker-Kraft furniture has been designed and manufactured especially for boat use and is the most durable and comfortable furniture for marine service.

Write today for complete illustrated catalog and prices.

WICKER-KRAFT CO.,
H.G. PRATT, Proprietor
Newburgh New York, U.S.A.



A Chain Is No Stronger Than Its Weakest Link

ELIMINATING THE WEAK SPOTS IN BOAT EFFICIENCY

The FACTORY Three-quarters of an acre of floor space devoted to producing fast boats. Every modern facility for high-grade work, and for health and comfort of employees—the first step in efficiency.

The MEN A loyal and enthusiastic force, organized in all departments, produce Albany Boats under the personal supervision of John L. Hacker, Vice-President and Designer.

The BOATS Speed, seaworthiness and reliability—all famous qualities of Albany Boats, are combined in this handsome, luxurious craft. A tried and true product—every detail of which was proven before offering for sale—thus ensuring the owners a sense of pride and secureness never before obtained.

It was a standard Albany runabout that won the Southern Championship, and the Tortoise also won the Australian Championship in February. Pretty good for mid-winter!

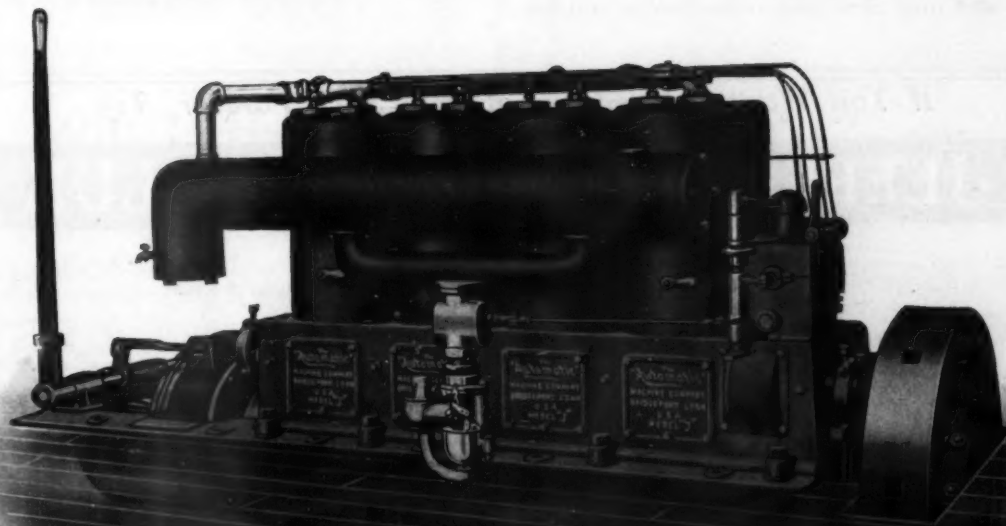
PROOF Repeat orders from discriminating buyers. You are welcome to our shops. Have a ride and learn the supreme enjoyment in using Albany Boats.

An illustrated catalog of runabouts or express cruisers on request.

ALBANY BOAT CORPORATION SHOP—WATERVLIT, N. Y.
MAIL—BOX 530, ALBANY, N. Y.

"The Automatic"

MADE BY
THE AUTOMATIC MACHINE CO.
BRIDGEPORT, CONN.



A "down to the minute" motor 4 Cylinder, 4 Cycle, 9-12 H. P.

with reverse gear and a perfected
mechanical Starter Complete

THE New Aristocrat Marine Motor fully equipped and guaranteed with starter \$200, without starter \$175. F. O. B. Detroit.

Quantity production and anticipated advance of the metal market make it possible for you to secure this high-grade power plant that embodies all the best points in marine design and construction.—Durability, power, lightness, flexibility, velvet smoothness and freedom from vibration.

Prompt deliveries guaranteed. You'll find further details and description in our catalogue. Send for it.

CARSON MOTOR COMPANY

Sales Department
5 So. Wabash Avenue
Chicago, Ill.

654 Franklin Street
Detroit, Mich.

MoToR Boating's Bureau for Recovering Stolen Boats

If you are interested in protecting your boat against loss or theft, or wish to recover it most easily if it is stolen, turn to Page 84 of this issue and read about Motor Boating's Bureau for Recovering Stolen Boats.

This service is absolutely free to all Motor Boating subscribers. Register your boat in this bureau. It costs you nothing and may save you considerable trouble.

If You Want a Friend That Will Stick Forever, Try

JEFFERY'S MARINE GLUE

In some places economy is alright, but when you come to Marine Glue the difference in cost between the ordinary and the best is so little that you can't afford to take the risk of having to do the job over again for the sake of saving a little on the material.

It pays to use Jeffery's in the first place, every time. Jeffery's is universally conceded to be the best and most reliable marine glue. Jeffery's Glues are specified by the best designers and used by the best builders. A little investigation will show you why.

No. 1—Extra Quality for Deck and Hull Seams of Yachts and Motor Boats. Black, white, yellow or mahogany color. Give black the preference; it is more elastic and satisfactory in every way.

No. 7—Soft Quality for Waterproofing Canvas, for Covering Decks, Tops of Cabins, Canvas Boats, Canoes and Flying Boats. Black, white or yellow. With a coat of paint once a year it will last as long as the boat.

Waterproof Liquid Glue is used for the same purposes as No. 7, Soft Quality. Ready for use and requires no heating; simply open the can and paint it on. Especially recommended for waterproofing canvas covering of flying boats, and for wing surfaces. Will also attach canvas, cork, felt, rubber, leather, and linoleum to iron, steel, or wood.

Special Marine Canoe Glue. Best Filler for Canvas. Black, White and Yellow. Every canoeist should carry one of our 25c emergency cans. Sent by mail on receipt of 30 cents in stamps.

FOR SHIP'S DECK USE No. 2 First Quality Ship Glue, No. 3 Special Navy Glue. Put up in 1, 2, 3 and 5 lb. cans; also 14, 28, 56, 112 lb. boxes.

Sold by all Boat and Canoe Supply Houses, Hardware and Sporting Goods Dealers.

Write today for booklet "What to Use and How to Use It." It contains a fund of valuable information that every practical boat owner and builder should know.

L. W. FERDINAND & COMPANY, 152 Kneeland Street, Boston, Mass., U. S. A.



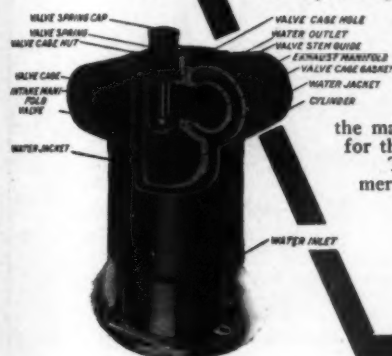
A Frisbie Motor Runs Our Factory

Our faith in our product is shown by the fact that for several years we have driven the machinery in our plant with Frisbie Motors. At the present time we are running one of these motors exclusively on Kerosene. We are therefore in a position to guarantee the performance of our Kerosene Motors under severe service conditions.

Kerosene fuel is not a novelty with us. We have been studying this problem for years, experimenting, testing and improving our kerosene attachment to its present state of perfection.

The 15 H.P. Frisbie Valve-in-Head Kerosene Motor is a double cylinder machine with 6-inch bore and 6-inch stroke. It will develop within 6% as much power on kerosene as on gasoline. The kerosene and gasoline fuel systems are absolutely independent. Ready for prompt delivery.

Using Kerosene for Fuel



The Motor of Maximum Efficiency

No one disputes the superior efficiency of valve-in-head motors. Engineers concede they give from 15 to 25% more power for the fuel consumed.

The Frisbie Valve-in-Head Motor has reached the highest efficiency known in the marine field. It gives more power for its size, uses less fuel for its power and lasts longer for the service it gives.

Ten models, 3 to 75 H.P., one to six cylinders. Used in all types of pleasure and commercial boats.

The Frisbie catalog is an interesting explanation of the valve-in-head principle. You will enjoy reading it. Write for it today.

The Frisbie Motor Company, Inc., 7 College Street, Middletown, Conn.
Export Dept., 96 William St., New York, N. Y.



Aerothrust

"The Aviation Motor for Rowboats"

Aerothrusting—newest, simplest, most fascinating method of boat propulsion. You simply fly over the water with an Aerothrust, for the propeller is entirely above the water—

Will Drive a Boat

Wherever a Boat Will Float

Simply clamp this aviation motor to your rowboat or canoe—give the crank a turn and away you go. A big, proven success for three years—hundreds of users testify to Aerothrusting's practicability and fascination.

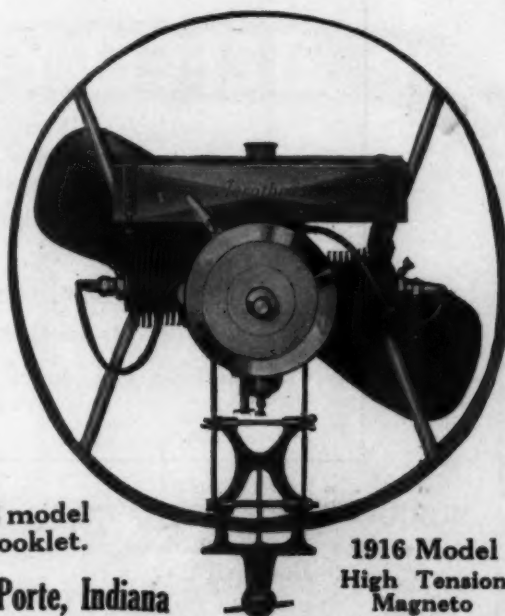
Aerothrust burns either gasoline or kerosene; is perfectly portable; a woman or child can carry, start or operate it.

When not in use in boat, is available for stationary work—also drives sled or iceboat in winter. A marvelous motor of a hundred uses.

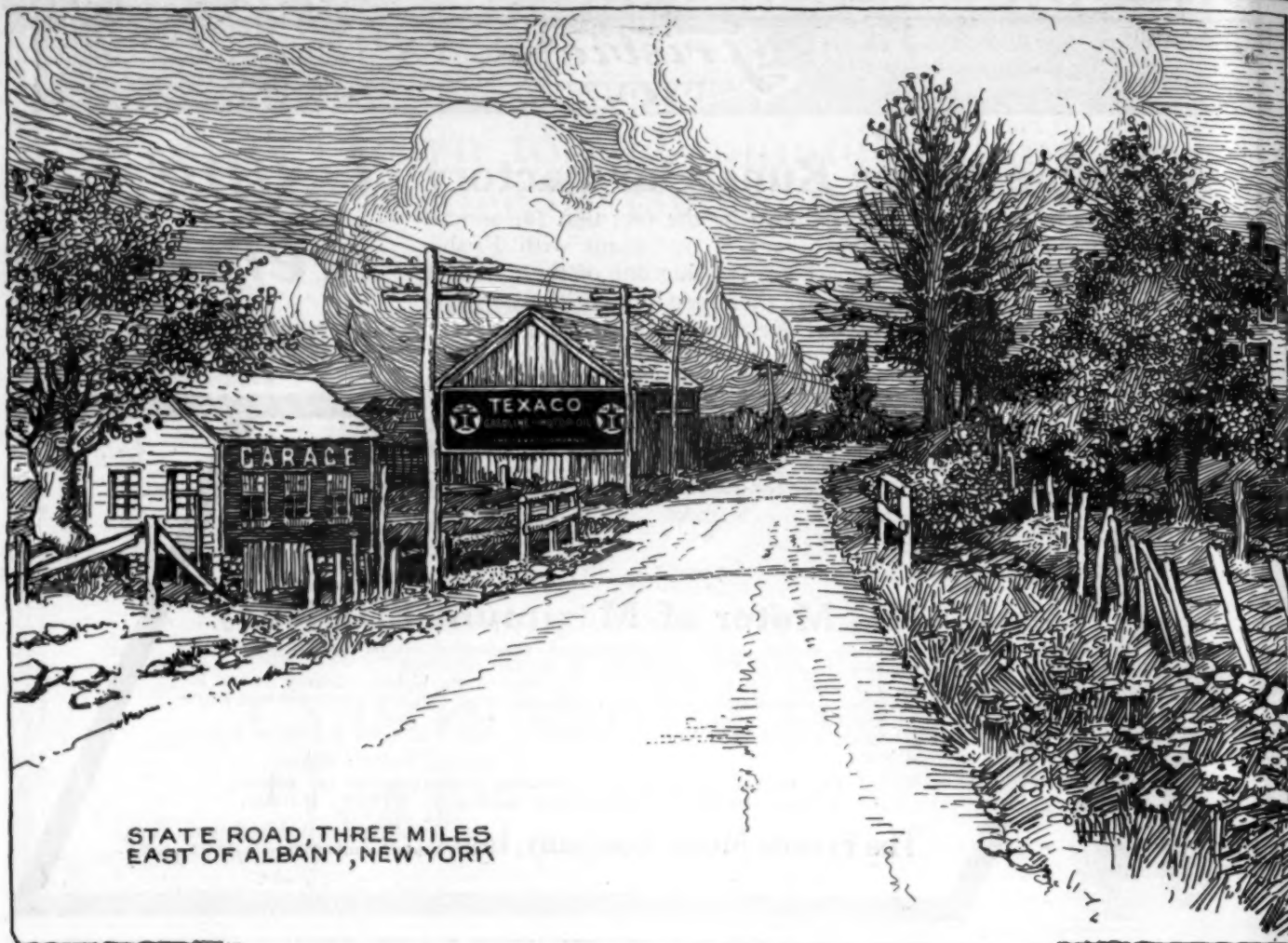
Agents
Dealers
Wanted

Complete with high tension Magneto—the 1916 model is a wonder. Write today for illustrated booklet.

AEROTHRUST ENGINE COMPANY, 309 Washington St., La Porte, Indiana



1916 Model
High Tension
Magneto



Viper
Trade Mark Reg.,
U. S. Pat. Off.

Sea Sled.
Trade Mark Reg.,
U. S. Pat. Off.

VIPER SEA SLED

Hickman Patents.



32-foot Sea Sled for U. S. Navy Dept., running at 40 miles.

This boat has planed with twenty-four passengers. Send 25c in stamps for latest bulletins.

MURRAY & TREGURTHA CO.,
340 West First St.,
South Boston, Mass.

N. Y. Office, PAUL D. LE VENESS, 20 Broad Street

VIPER CO., Ltd.,
PICTOU, N. S.,
Canada.

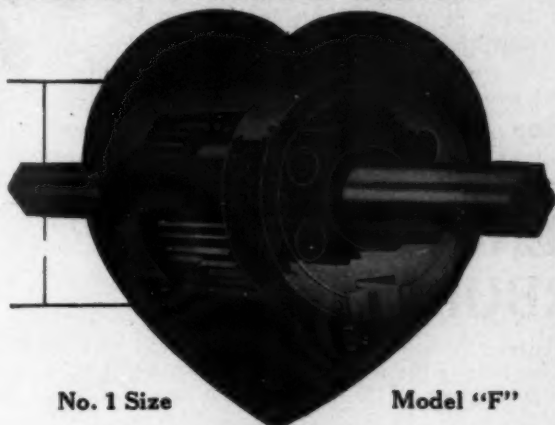
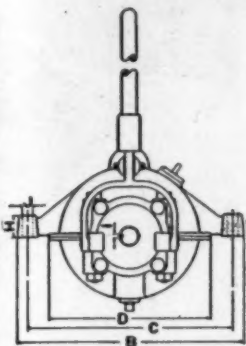
THE JOHNSON MARINE REVERSE GEAR

Embodies the A. B. C. of High Grade Reverse Gear Construction

A for ALLOY STEEL: 3 1/4% Nickel Steel, used in all GEARS and SHAFTING properly hardened and heat treated.
B for BALL BEARINGS: DOUBLE ROW BALL BEARINGS of an approved type on the main drive shafts in each end of the case, the propeller end being a DOUBLE THRUST BEARING.
C for CLUTCHES:

The Johnson Friction Clutch

in a DOUBLE TYPE is THE HEART OF THE NEW JOHNSON ALLOY STEEL REVERSE GEAR. Investigate these features, new to REVERSE GEAR construction, which we have successfully applied and used, and then use your own judgment in selecting the Gear for your own boat for the coming season.

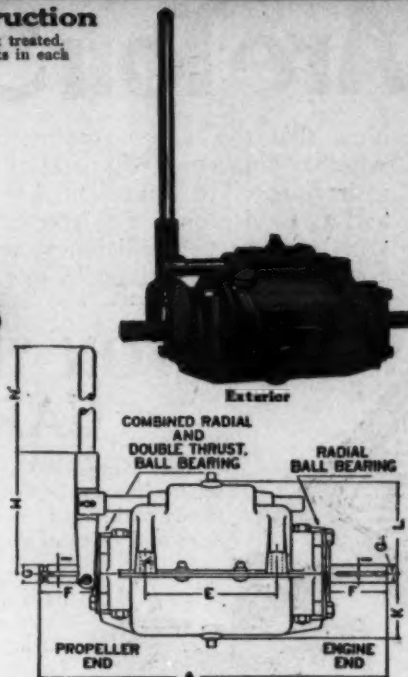


No. 1 Size

Model "F"



Showing construction



Exterior

COMBINED RADIAL AND DOUBLE THRUST BALL BEARING

RADIAL BALL BEARING

PROPELLER END

ENGINE END

Gear No.	H.P. Per 100 R.P.M. Max.	H.P. for High Speed Motors Max.	H.P. for Medium Speed Motors Max.	WEIGHT		List Price for Cast Iron Case	List Price for Aluminum Case	DIMENSIONS IN INCHES													
				Cast Iron Case	Aluminum Case			A	B	C	D	E	F	G	H	I	J	K	L	M	N
0	1/2	5	3	23	19	\$24.00	\$36.00	12 3/4	7 1/4	7	5 1/4	4 1/4	2	3 1/4	1 3/4	1 1/4	1 1/4	2 1/4	3 1/4	4 1/4	7 1/4
1	1	10	6	40	32	36.00	48.00	15 1/4	9 1/4	8 3/4	6 1/4	4 1/4	2 3/4	1 3/4	1 1/4	1 1/4	2 1/4	3 1/4	4 1/4	5 1/4	13 1/4
*1 "A"	1 1/2	20	10	70	55	42.00	54.00	19 1/4	10 1/4	9	7 1/4	6 1/4	3 3/4	1 3/4	1 1/4	1 1/4	2 1/4	3 1/4	4 1/4	5 1/4	15 1/4
2	3	30	15	93	75	48.00	60.00	21 1/4	11 1/4	9 3/4	8 1/4	6 1/4	4 1/4	1 3/4	1 1/4	1 1/4	2 1/4	3 1/4	4 1/4	5 1/4	15 1/4
*3	5	50	25	247	190	72.00	90.00	27 1/4	16 1/4	14 1/4	11 1/4	8 1/4	5 1/4	1 3/4	1 1/4	1 1/4	2 1/4	3 1/4	4 1/4	5 1/4	27 1/4

*Delivery date on request on these sizes.

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN



When you're 'way up the river or miles out on the lake and the wind suddenly dies down — just give the fly-wheel on your Evinrude a pull and you're off in a hurry—the Evinrude never fails.

Hundreds of yachtsmen and large power boat owners realize that the

EVINRUDE

DETACHABLE ROWBOAT & CANOE MOTOR

is almost a necessity for the tender or dinghy. It makes quick work of placing guests and supplies aboard-ship. Mighty convenient for "running around," fishing, etc.

The 1916 Evinrude catalog tells all about the new Four-Cycle Twin, which has more speed and more power. It also tells about the many improvements in the Single Cylinder models. Write today for your copy.

EVINRUDE MOTOR COMPANY

483 EVINRUDE BLOCK

MILWAUKEE, WIS.

Over 60,000 Sold

69 Cortlandt Street
214 State Street
436 Market Street
Front and Morrison Streets

New York, N. Y.
Boston, Mass.
San Francisco, Cal.
Portland, Ore.

EVINRUDE MOTOR COMPANY, 483 Evinrude Block, Milwaukee, Wisconsin.

Kindly send me a copy of the 1916 Evinrude catalog.

Name

Address

City

State

POWER THAT NEVER FAILS



When writing to advertisers please mention MOTOR BOATING, the National Magazine of Motor Boating. Advertising Index will be found on page 39.

Are You Satisfied?

Now that the season is almost over, stop a minute and consider whether your engine has run as smoothly this year as you would like to have it. Are you satisfied? Do you get as much power and speed, and as good economy as you used to get? Can you afford to get along with 50% or 75% efficiency, when for a few dollars more you can get 100% efficiency, at least in so far as carburetion is concerned? Perhaps all you need is a

KINGSTON "ENCLOSED TYPE" CARBURETOR

A new Kingston Carburetor puts a degree of snap and vim into your engine that you can secure in no other way. Simply the feeling that the engine is doing better is worth all it costs, to say nothing of the improvement in fuel economy and many other advantages. It is made for all sizes and types of engines.

This carburetor is absolutely up-to-date—designed for the poor grade of gasoline we all have to use these days. Remember, the gasoline used three to five years ago was so much more volatile and easy to vaporize that a carburetor designed for that fuel is utterly inadequate today.

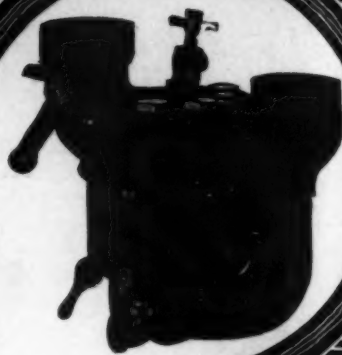
Let us prove what a Kingston will do for you at our risk. If it satisfies you, you will want it. If it doesn't, you lose nothing. Put it up to us.

Write today for price, trial offer and guarantee.

BYRNE-KINGSTON & CO.
KOKOMO, INDIANA

New York Office, 1733 Broadway
Chicago Office, 1436 Michigan Ave.

Boston Office, 111 Haverhill St.
Detroit Office, 579 Woodward Ave.
Los Angeles, 332 West Fifth St.



GREAT LAKES BOAT BUILDING CORPORATION



The shops and yards of this company, the largest and best equipped of their kind in the United States, are devoted exclusively to the construction of stock model and special runabouts

and cruisers of the highest grade. Inquiries should state the approximate size and type required, the number of persons to be accommodated and the speed and delivery desired.

GREAT LAKES BOAT BUILDING CORPORATION

Saint Louis Yacht and Boat Company ./. Milwaukee Yacht and Boat Company

MILWAUKEE,

WISCONSIN, U. S. A.

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Mr. Boat Owner—

Is your propeller giving you the results it should? Are you getting the utmost speed or the highest efficiency from your outfit? Does your boat run smoothly without any unnecessary vibration? Is your propeller driving the boat ahead instead of cutting a hole in the water? If you are not getting the results you desire, the prescription that will cure your motor boat troubles is a

Hyde Turbine Type Propeller



has this
Hywimeo
TRADE MARK
REG. U.S. PAT. OFF.

Correct design develops the highest speed. Large blade area and perfect balance give maximum efficiency and eliminate churning and vibration. An investment in a HYDE will return substantial dividends in increased speed, saving of fuel and the feeling of satisfaction that only a perfect running outfit can give. The many combinations of diameters and pitches insure a proper propeller for every type of boat from the light hydroplane to the heavy work boat. There is a HYDE for your boat. Let us tell you about it. It will save you many dollars before the season is over.



has this
Hywimeo
TRADE MARK
REG. U.S. PAT. OFF.

WE ALSO MAKE THE

GALE PROPELLER

to meet the demand for a lower priced propeller than the Hyde. It is made from Hyde patterns in the same wide range of sizes.

We will be pleased to mail catalogue and prices free on request

HYDE WINDLASS COMPANY

-:-

Bath, Maine, U. S. A.

Get the Newest L-A Engine Book

AN L-A ENGINE
FOR EVERY PURSE
AND PURPOSE.

THE question of selecting the right engine for that boat of yours is an important one. It will pay you well to get all the information possible before making your final decision, as the satisfaction you get from your outfit will depend largely upon the care you take in choosing your motor. You will find the new L-A engine book brim full of valuable hints and interesting engine information. It describes our complete line of inboard and outboard motors for canoes, rowboats, pleasure boats and work boats.

L-A rowboat motor with either flywheel magneto or battery ignition, rudder steered, powerful, silent and smooth running.

L-A 2-cycle motors in both single and double cylinder types and made in sizes from 2½ to 12 H.P., and are noted for their extreme simplicity, big power, and qualities of absolute dependability.

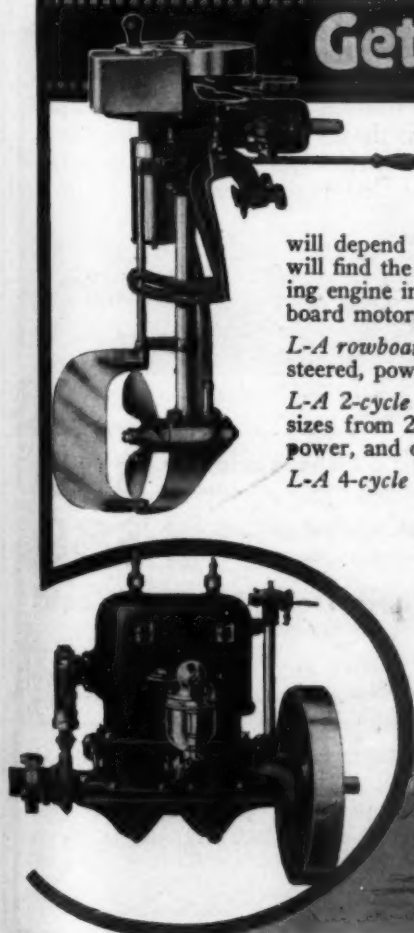
L-A 4-cycle motor is one of our newest models. It is a 4-cylinder, 14 H.P. power plant with cylinder cast *en bloc*. A very clean, compact and accessible engine that will give splendid service in pleasure boats, work boats or speed boats.

30 Days Trial

Our liberal plan of selling motor on 30 days trial gives you the chance to try out L-A Motor in your own boat before making your final decision. This is the safest way of buying your engine—the new engine book gives complete details.

Lockwood-Ash Motor Co.

1301 Horton Ave., Jackson, Mich.



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Kyanize

KY-AN-IZE



White Enamel and Waterproof Spar Finish FOR ALL YACHTING CRAFT

Kyanize White Enamel is different from the white paint you've been using. Kyanize White Enamel will wear longer, look better, is whiter and will add more speed to your boat. This is the Enamel used on the high grade boats.

Best for all white work on wood or metal. Leaves a durable high gloss finish easily cleaned. It will not crack, chip or peel. And we refund the money for the empty can if it does not do all we claim.

Kyanize Spar Finish is a perfect exterior Varnish. Sun, rain, heat, cold cannot affect it. Will not turn white or blue in salt or fresh water. The United States Navy uses thousands of gallons. Best varnish for all marine work.

If there is no Kyanize Agent in your town don't take something "just as good." Write us direct.

Boston Varnish Company

EVERETT STATION

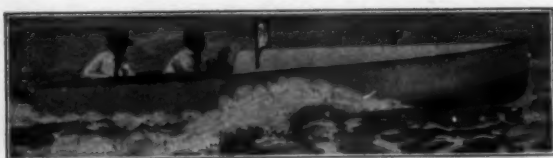
BOSTON, U. S. A.

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Warehouse and Office—519 West Twelfth St.

SAN FRANCISCO

Warehouse and Office—311 California St.



Fastest Boat in the World



Two Views—17-Footer

\$45 Complete k. d. boat as described.

\$95 Finished boat ready for motor.

BIG BOAT BOOK FREE

showing over 100 designs. Cruisers—launches—sailboats—rowboats and canoes.

Brooks Mfg. Co.

6305 Rust Avenue

SAGINAW, Mich., U. S. A.

Utilize your spare time or make \$10 and up per day putting these boats together for your local trade. No skill required. We furnish the knock-down boat complete (best oak and cypress), everything cut to shape and fitted, with hardware and fittings. The k. d. prices quoted include everything except paint. This is a real business opportunity. We have started hundreds.

Builder-Agents Wanted

10 TO 32 MILES WITH 4-TO 25-H.P.

A comfortable family launch or a racer. Semi-V-bottom design—roomy, staunch and seaworthy. Becomes a stepless hydroplane with 12 H.P. or more. We furnish the finished boats, painted, varnished, with fittings and steering gear, all ready for the motor, at the prices quoted. Get our prices with 4- to 25-H.P. motor installed, ready to run.



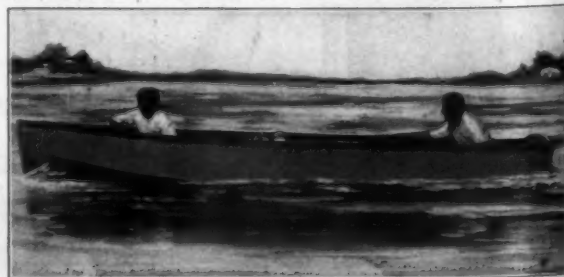
Two Views—15-Footer

Complete k. d. boat.....**\$25**

Finished ready for motor **\$45**

With inboard or outboard motor installed **\$89**

Lowest Priced Boat in the World

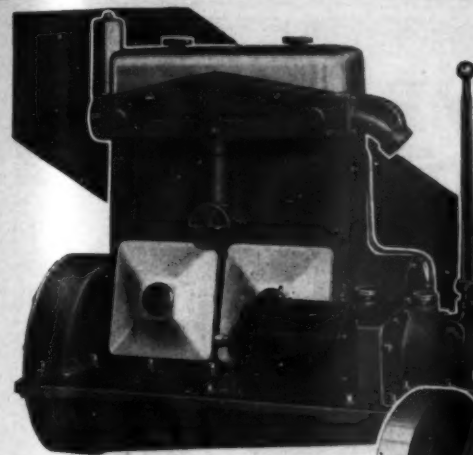


For Cruiser or Canoe

Whatever kind of an engine will best fit your needs—2-cycle or 4-cycle, one cylinder or six, 3 H.P. or 50 H.P.—you'll find it in the Ferro line.

There are 15 Ferro models. Our service department will help you pick the right one.

Made in the largest marine engine plant in the world, backed by service that extends to every part of the globe.



4-Cycle "Four" for Medium Duty

All enclosed: 20-30 H.P. Bore, 4 inches. Stroke, 6 inches. Catalog 1054.

Wherever there are power boats, you'll find Ferro engines.

4-Cycle "Four" for Light, Fast Service

A brand new engine. 10-14 H.P. Bore, 2½ inches. Stroke, 4 inches. Catalog 1054.

Ferro Rowboat Motor

Has Bosch high tension magneto, float feed carburetor, etc. Catalog 1051.

THE FERRO MACHINE & FOUNDRY CO.
510 Hubbard Avenue
Cleveland, Ohio

FERRO

2-Cycle, 6 H. P. Special

Especially suited to light pleasure launches. Bore, 3½ inches. Stroke, 3¼ inches. Catalog 1052.



Not alone because all materials are rising in price at such a rate that orders placed now will effect a big saving—



TO you who, during your recent Florida season, noted that seventy-five per cent of the notable houseboats there were Mathis-built—

—to you who resolved that the next Florida season would see you there in your own Mathis-built houseboat—we offer the suggestion that you take up the matter immediately.



Directly above is shown the 68-ft. **NAHME-OKA II**, the second houseboat built by us for Mr. H. N. Baruch, New York.

At the upper left, the 75-ft. **ALELA**, built by us for Mr. Albert Disston, for whose father we created the new type houseboat when we built the Cocopomelo in 1909.

At upper right, the 70-ft. **LANAI**, owned by Ex. Com. A. C. James, of the New York Yacht Club.

Lower left, 77-ft. **DORINDA**, built 1915 for Henry W. Savage.

Lower right, one of a half-dozen 43-ft. **HOUSEBOATS**, of the one-man control type created by us. Economical in up-keep and gasoline consumption. At home in Florida or any bay, river or inlet along the Atlantic Coast.

MATHIS YACHT BLDG. CO.
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nor alone because our yards are working at full capacity for months ahead—but also because those who delay action until it is too late to have a new boat built will learn to their sorrow that houseboats of the proper type for Florida can neither be bought nor chartered in season—so great is the demand.

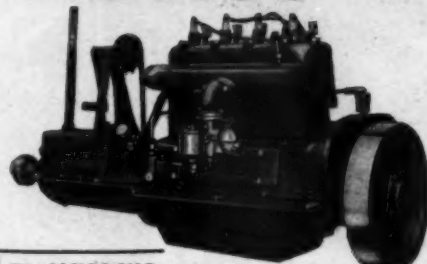


All Mullins Boats Now Powered With 4 Cycle Motors

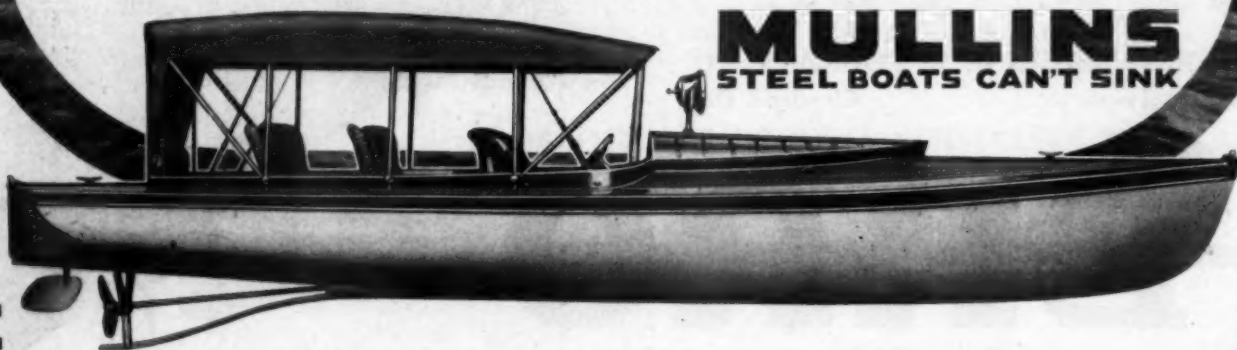
THINK of a light weight, high speed, 4-cycle, 4-cylinder, 8-10 H. P. motor in a Mullins steel boat; any model 16 foot to 26-foot. More power—greater speed—less weight—easier starting—more economical—less vibration. You can have a 4-cycle motor with reverse gear and built-in magneto in any one of Mullins large variety of models and types of motor boats at regular prices—\$260 and up. Mullins non-sinkable steel boats are of exclusive Whittelsey design. Equipped with silent under-water exhaust. Cannot sink. Leak-proof, smooth steel hulls that never require calking. Guaranteed efficiency and durability—motor boating at its best. Don't buy a steel or wooden motor boat, rowboat or canoe until you have read Mullins' catalog—free on request.

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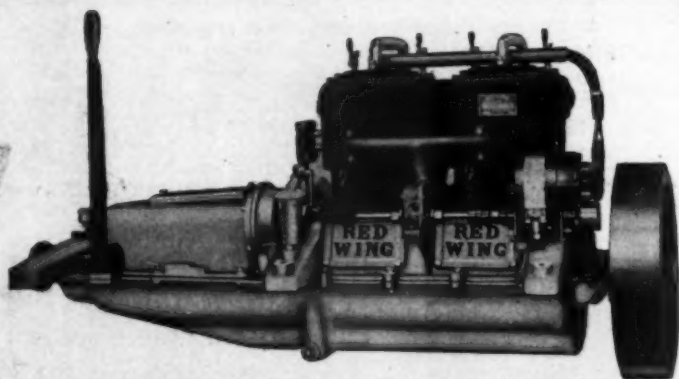
World's Largest Manufacturers of Steel and Wooden Pleasure Boats



The MULLINS
8-10 H. P. Universal High Speed 4-Cycle Motor.
Four cylinders, 2 1/4 x 3 1/2 inch cast en bloc. Speed, 300 to 1100 R.P.M. Aluminum crank case. Vertical plunger oil pump. Die cast bearings. One-piece hardened cam shaft. Oil gauge in base. All parts interchangeable. Weight 225 lbs. Without reverse gear, 190 lbs. Berling Magneto built in. Snow & Petrelli Reverse Gear. The ideal power plant for small launches from 16 to 26 feet in length.



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THE MOTOR WITH POWER TO SPARE

What Do You Ask of a Motor?

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Perfect Light for Your Boat

No boat is *completely equipped* without adequate lighting. No boat is so small nor so large that it cannot be fitted with Prest-O-Lite. It adds to pleasure and to safety.

Get this brilliant, dependable light on your boat. Under all conditions, at all times, Prest-O-Lite gives you perfect service and satisfaction at small cost—combines the highest efficiency with the utmost in practical convenience and economy.

Prest-O-Lite provides you with one lighting system that you can use for every light on your boat, gives an abundant supply of light for searchlight, and is very convenient for signal and cabin lights.

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Individuality in Power Yachts

Matthews Power Yachts are not built from stock plans and patterns. Each has its own individualities. Each is built to meet the personal likes of the owner with reference to model, accommodations, motive power, speed, cost. The materials used in

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are the best procurable. Our resources are ample to enable us to invest large sums in such stocks of selected lumber as are improved by thorough seasoning.

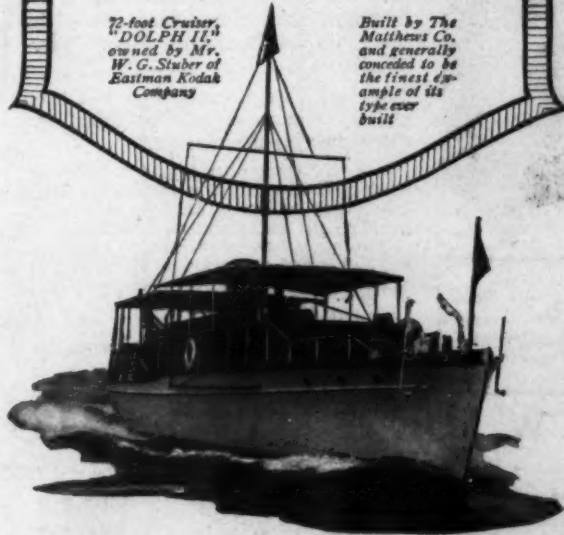
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THE MATTHEWS COMPANY
602 LAUREL AVE., PORT CLINTON, O.

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owned by Mr.
W. G. Stuber of
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Built by The
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and generally
considered to be
the finest ex-
ample of its
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When fire threatens your boat with destruction—when hot, licking flames of burning gasoline flash the danger signal—then only the quick action of an efficient fire extinguisher can save the boat.

THE J-M FIRE EXTINGUISHER



\$8.00 Brass or Nickel Finish—Bracket Included

quickly puts out the incipient fire of gasoline, oil or electrical origin.

It can be pumped and aimed simultaneously, or by a few seconds' pumping with the nozzle closed enough air pressure is developed to shoot a steady stream straight to the base of the flame. This leaves one or both hands free to accurately direct the stream.

The sealed nozzle tells you at a glance that the J-M Fire Extinguisher is ready for instant use, no matter how long it hangs in its bracket.

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STOLEN!



REX, Semi-Speed Boat

20 feet long, 52-inch beam, painted yellow on deck and sides; white stripe at water edge; red under water; two exhausts, one rear, one upright alongside of engine. Coaming split on both sides, brass plate on top of coaming. Rear seat crosswise, with back attached, middle seat (locker), three lids on top, two small, one large. Clutch handle works through the top. Natural wood inside, mahogany seats, sheer streak rudder outboard and transom. Oak quadrant on rudder, brass rail on quadrant. Two-cylinder, two-cycle Termaat and Monahan engine, aluminum base, copper water jacketed (one dent in one jacket) intake on right hand side, valve stems working through outside of manifold, exhaust on left side; manifold of exhaust cracked; 3/4-inch pipe fitted to manifold to pick up hot air to carbureter, 1 1/4-inch pipe on air intake to carbureter, private mark on clutch, flywheel piping, carbureter, crankshaft, timer, also a number inside of engine. Private marks on propeller wheel, shaft, strut, stuffing box, steering wheels, in fact, all hardware.

A Reward of 50 Dollars

will be paid to the person who furnishes information that will result in the recovery of the above described boat, which was stolen from Cramer's Hill, N. J. If you see a boat that you think is REX wire or write full particulars to C. H. KLOCK, 1309 Arch Street, Philadelphia, Pa.

N. B.

If your boat has been stolen, MoToR Boating will help you to recover it, absolutely free of charge, if you are a subscriber.

Send us a photograph of your boat with full particulars on the blank below. This will be filed in our office and if your boat is stolen or lost, wire or write us, and in the next issue we shall publish an illustration with detailed description. If you instruct us to offer a reward, we shall do so. Your ad will be read by thousands of motor boatmen, on every harbor, river and bay in this country.

Fill in the blank below and return it to us, now, with a photograph. If you are not a subscriber, send us \$1 for a full year's subscription and you will be entitled to this service.

Owner	Remarks
Name of Boat	Address
Length	Type
Make of Motor	Beam
No. of Cyl.; Cycle	Horsepower
Planking Material	Bore..... Stroke.....

Address all communications to

Editor MoToR Boating
119 W. 40th St., New York

Not Alone The Sterling—

but also the Speedway, Universal, Van Blerck, Watertown and Wisconsin folk—all are willing to let you have a Berling Magneto without extra charge to you. Read what the Sterling people say:

Sterling
THE ENGINE REFINEMENT
FOR THE
FINEST BOATS THAT FLY

Buffalo, N. Y., Feb'y 25th, 1916.

Ericsson Mfg. Co.,
Makers of BERLING MAGNETO
Buffalo, N. Y.

Gentlemen:-

Following our invariable custom of providing our motors with the highest grade of equipment obtainable, without regard for cost, we are placing the Berling, two spark, dual magnetos on our new Model F motor, which is made in units of eight, six and four cylinders. The use of the Berling magneto on this motor shows that we consider this magneto to be the finest procurable in America today. The splendid service which it is rendering (a service of unmatched severity) seems to substantiate conclusively this assertion.

Yours very, truly,
STERLING ENGINE COMPANY.

Why the Berling is worth more—

One-piece frame — water-proof — oil-proof — sturdy — reliable — efficient

4
6
8 CYL. DUAL TWO-SPARK HIGH-TENSION MAGNETOS.

(Also all types for all types of motors)

Berling Magneto

A few far-sighted marine-motor folk can get some interesting news by writing

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PERHAPS you don't believe in speeding—but it's satisfying to know you can get speed when you want it. That there's a power reserve in your motor to be called on in a pinch.

You can safely count on it if your motor is equipped with

McQUAY- NORRIS
LEAK-PROOF
PISTON RINGS

Because they improve compression and get every ounce of power out of the fuel. Their light tension cuts down friction losses. They keep back surplus oil and prevent fouling of spark plugs and spoiling of valve seats with excess carbon.

All good supply houses, repair shops and marine stores have them in stock.

Send for FREE booklet—"To Have and to Hold Power"—the standard handbook on gas engine compression. It tells what Leak-Proof efficiency means. Write Dept. B.



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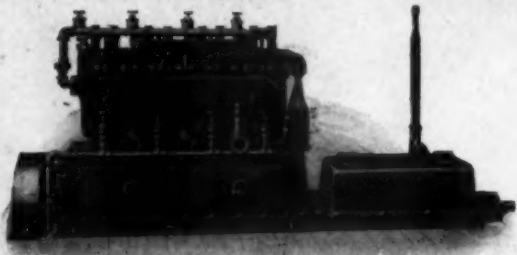
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by the rapid advances in the price of gasoline
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WRIGHT KEROSENE ENGINES



Wright Four Cylinder Kerosene Engine.

Be Prepared Now

so that when the next advance is made in the price of gasoline you can smile at—and not with—the other fellows.

These Kerosene Engines have two carburetors, one for gasoline and one for kerosene, with a separate generator for thoroughly vaporizing the gasoline. A piston type throttle valve completely shuts off one fuel while the other is being used.

Valve-in-Head Engines

All Wright Marine Engines are real heavy duty engines with overhead valves and every part designed for severe service. They have Bosch Low Tension Magnetic Make and Break Ignition, the spark being advanced or retarded through the Magneto, the same as a jump spark system. The entire valve mechanism and camshaft can be removed without stripping the engine or removing any other parts.

Reverse gear with large spurs is built on same base casting with engine and entirely enclosed. No gears are in use on forward drive and the thrust is taken up by large adjustable Ring Type Thrust Bearings. Reverse gears can be removed without disturbing engine crank shaft.

Crank shaft and connecting rods are hand-forged from solid billets of 25 to 40 point Carbon Steel. The materials used for each part and the methods of manufacturing insure uniformly high quality and endurance in the entire engine.

3-Cyl.	6	$\times 7\frac{1}{2}$ "	22-30 H.P.
3-Cyl.	$7\frac{1}{2}$	$\times 9$ "	35-45 H.P.
4-Cyl.	6	$\times 7\frac{1}{2}$ "	30-40 H.P.
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6-Cyl.	6	$\times 7\frac{1}{2}$ "	45-65 H.P.
6-Cyl.	$7\frac{1}{2}$	$\times 9$ "	70-90 H.P.
6 $\times 7\frac{1}{2}$ " runs from 400 to 550 R.P.M.			
7 $\frac{1}{2}\times 9$ " runs from 350 to 475 R.P.M.			

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Advertising Index will be found on page 39.

The San Juan Islands

(Continued from page 9)

this latitude, is at about nine o'clock of a summer's evening. A couple of tug boats, with huge booms of logs, and a fisherman or two, also, are anchored there, to await the turn of the tide that will take them out in the first rays of dawn. For Deception Pass, narrow as it is, carries the huge tidal movements of the waters back of the islands, and that means a roaring stream through the deep pass that one must ride only on the ebb if he would make certain of getting out.

It is windy outside and we can hear the roar of the surf as the full force of the waves beats down the straits from the Pacific on the west side of the island, but we do not worry, for we are snug and safe, and the slap of the flag halyards on the signal mast is a restful lullaby.

The first rose streaks of dawn on the Cascades find us awake after a fine night's sleep under blankets, and in that soft half light that precedes the full burst of day, we go swinging and careening through the wonderful pass, almost close enough to shore at times to reach out and touch the rock-ribbed, precipitous banks.

We find that the wind has blown itself out during the night, and, with the change in tide, the straits are again calm, with only the swells of last night's agitation to remind us of what may happen out on the wide expanse of Juan de Fuca's breast when the winds blow.

Once clear of the pass, we have a choice of many routes, but on this trip we set a course up around Burrows Island Light, and through Bellingham Channel toward the north. As we clear Shannon Point we see, off to eastward, the smoke and buildings of Anacortes, one of the principal lumber and fishing cities of the Sound, and had we more time at our disposal, we could find much to interest us there. But we are going right on this time, and as we chug along we drink in the fresh, clear morning air that acts as a veritable tonic and puts all in the best of humor. We are never far from shore, and the fir-clad hills, the precipitous, rocky points, the far-distant mountain ranges, all combine to delight the cruiser's every sense.

Mid-forenoon finds us at Village Point, where we drop the hook and row ashore for our first visit to a salmon cannery. The wonderful process, from seeing the fresh-caught beauties enter the plant to watching the labeled cans headed for the warehouse, is all courteously shown us, and after luncheon aboard we head northward once more and an hour later find ourselves in beautiful Echo Bay, in Socia Island. We'll up into the bay we go, and those of our crew that have never been here before find it hard fully to express their appreciation of this beautiful spot. It is a land-locked harbor, the spot we have chosen, and calm as a mill pond.

We know a place, a few of us cruising men, which we keep as secret as a Masonic oath, where the little clams grow like pebbles, and thither we soon pull in a dinghy, and that night Saki serves us with the most delicious clam chowder ever tasted. And while we are getting the clams, the rest of the crew go ashore to the pebbly beach at the head of the bay, and a cool, invigorating swim gives them the appetite that plays havoc with our larder later in the day.

We don't start very early the next day, and then only to run down the northeast shore of Orcas Island, through Obstruction Pass and up into East Sound, mooring at the wharf at Orcas, formerly Newhall. There a few of the party take along provisions and blankets and set off on the climb up Mt. Constitution, the highest point in the islands, 2,400 feet to the summit. From that vantage point they will see as far as eye can reach in every direction—the sun on the shimmering Pacific, the snow-clad mountains of half a dozen ranges, the scattered islands of a labyrinth below them, and the rippling pathways of a score of steamships, fishing boats and yachts. It is a wonderful sight, and they will enjoy it to the utmost. Tonight they sleep on the summits, and tomorrow they will come whooping back to the boat ready for further adventures afloat, ruddy of cheek and healthy of appetite.

We sail early and slip through Pole Pass, where one can almost touch the shore on either side, although the water is deep enough for a liner, and plow calmly on through a maze of beautiful islands, each different from the others, and all entrancing. Occasional ranch houses, once in a while a fisherman trolling, mayhap a fellow yachtman—these are the people one sees during the day. And at about noon we slip through a narrow little opening at the north end of San Juan Island and find ourselves in an absolutely land-locked harbor, from which there seems no egress. This is Roche Harbor, the site of a big battery of lime kilns, and the lazy smoke curling upward from their oil burners is seen as we enter. Here we anchor for an hour, while lunch is served, and then we're off again, but not by the way we came.

No, we're going to take Mosquito Pass, a narrow, winding little inlet requiring local knowledge, and from it we emerge to the southward and head for Cadboro Point, nine miles away and marking our first landfall in British territory, for the point is on the southern end of Vancouver Island. Across Haro Strait we shoulder our way over the first of the afternoon whitecaps, and later, as we emerge from Enterprise Channel, back of desolate Trail Island, where rips abound, we bump into the full-breezed chop coming down the Straits of Juan de Fuca from the open Pacific. The spray flies high over the pilot-house, but we plunge into it, and in less than an hour we have passed the Brochy Ledge Light, veered around into the outer harbor, and are sailing calmly up the winding fairway into the wonderful inner harbor at Victoria, B. C.

Surrounded on three sides by a solid masonry causeway, with the beautiful Empress Hotel facing the water, and the artistic provincial Parliament buildings to the southward, the harbor is one of the most attractive on the Coast. There is a wild scramble on the part of the crew to get into fannels and full shore regalia, for afternoon tea in the big palm room at the Empress, with the rippling of fountains, the soft laughter of Canadian women, and nowadays with the war talk from bronzed stalwart officers who are soon to leave for the front, is a real ceremony, and one that no visitor misses.

Victoria is a wonderfully fascinating city, and more English, they say, than any other in all Canada. The next day or two we spend in taking in the Marine Drive, out around the edge of the island through glorious natural parks, in visiting the naval base at Esquimalt, where regulations are strict now that war is on, and in seeing the hundred and one attractive spots adjacent to this lovely little city.

And on the morning of the third day we reluctantly leave up our anchor, and head out to the Straits again. Clear of the outer harbor we head in an easterly direction and by mid-forenoon we find ourselves in the center of a fleet of over a hundred big, healthy looking motor purse seine boats, scouring the waters south of San Juan Island for the silvery salmon that are now running.

For several hours we watch them fish, see the big nets go overside and encircle the immense schools of salmon, watch them haul the flopping, rippling mass aboard, and finally, when we get tired of this haul alongside a seiner that is not fishing, and talk wisely with the crew about courses, currents, lights and good harbors. They are sociable, these big fishermen, and we enjoy the talk immensely.

At night we haul into Richardson, a rocky, though perfectly safe harbor where a hundred purse seiners are our interesting company. We listen to their songs, and their music, of violin and accordion, and sleep the sleep of the tired, rocked by chummy little waves that slap their way in from outside.

Bright and early we are up the next morning, but early though we are the purse seiners have beaten us, having got away with the break of day. So we follow them out, and strike bravely across the broad waters in a southeasterly direction, for this is the last day of our cruise. Twenty-one miles of open water lies before us, from Richardson to Pt. Wilson, and by the time we get within a few miles of the point quite a sea is beginning to run in from outside. It gives us just a little idea of what may happen when the wind really blows, for these Straits of Juan de Fuca can be about the nastiest stretch of water in the States, so old mariners tell me. In fact, I've been on them when I wished I was elsewhere.

But we make the Sound in good time, and late that afternoon we pick up the haze over Seattle and before long are back on the Yacht Club float, every member of the crew heartily that the cruise should be so soon over.

We have traveled too fast, of course—any cruising man knows that. For we should have stopped days in some of those little harbors, where the rock cod and the sole and the delicious Dungeness crabs and the salmon are all there for the taking.

But we've had our little trip and we've enjoyed it, and our greatest joy now that we've returned will be in getting thousands of others to take it. For it is the grandest cruising water in the world, and we want others to know it, way down deep, so they won't rest till they've come out here and proved it to their own satisfaction.

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The Original 2-Cylinder Rowboat Motor

New features include tilting device, variable speeds, tiller at right side, water-proof timer, fool-proof carburetor, thrust adjusting gear case, aeroplane type magneto and many others.



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It Does Not Shake the Boat

Vibration is entirely eliminated by opposed cylinders that fire at same time. Reverses by simply pressing button. Runs perfectly at trolling speed or can skin the average launch on high speed.

Has the speed and then some

"It can pass any motor on our lake," is the message from Hibbing, Minn.

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Our line also includes a 2-cylinder, 3 H.P. vibrationless in-board marine engine for small launches, canoes, etc.



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10 NEW FEATURES

in the 1916

Waterman Porto

THE Waterman Porto for 1916 embodies many new features that will appeal strongly to outboard motor purchasers who are looking for maximum results in the way of power, flexibility and greatest possible all-around convenience.

For ten years the Waterman Porto has led the field in outboard motor construction, and this year a greater number of improvements than ever before will keep the Waterman Porto the first outboard motor in the world in the way of flexibility, accessibility and easy handling qualities.

A Few Words About the Original Outboard Motor

"A majority of the readers of Motor Boating undoubtedly know that the Waterman Porto was the first outboard motor on the market. In our new 1916 catalog, which is just off the press, I have given a brief history of the Porto motor, together with how the idea of building such a motor occurred to me, and incidentally showing an actual photograph of the very first outboard motor to be put on the market, following several years of experimental work.

"This brief story of the Waterman Porto will give you an idea of the difficulties first encountered in this field, and at the same time will show you the measures we have adopted to keep the Waterman Porto in the lead. If you are interested in this brief history of the first portable motor ever built, a copy of the new 1916 catalog, illustrated herewith, will be sent free on request."

C. B. WATERMAN



Unlimited Speed Control

One of the most important features in the Waterman Porto for 1916 is the new type reversible propeller, which gives unlimited control of the speeds and makes the engine one which might be called "the outboard motor with a thousand speeds." You can stop your boat in half its length—dock without stopping your engine—troll at any speed desired with any type or size of boat.

New Type Flywheel Magneto

The flywheel magneto used in the 1916 Waterman Porto is absolutely new and different from any other magneto used, either in outboard motor construction or other work. Its efficiency is guaranteed. This is just another of the many interesting and important features described in detail in our new catalog.

Instead of using the ordinary cheap mixing valve, the Waterman Porto is equipped with a very efficient and economical carburetor, which gives decidedly better control and at the same time more power and more speed.

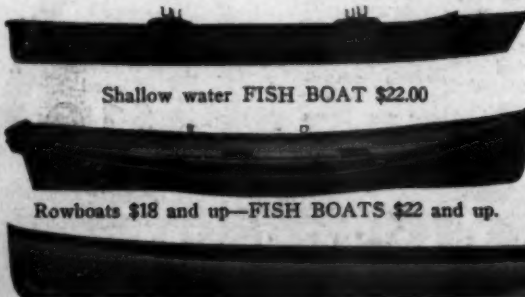
Send for This Book Today

It will be to your interest to get the latest copy of the Waterman Porto catalog, which describes in detail the various new features incorporated in the 1916 design, such as more liberal bearing surface, double capacity fuel tank, newly designed pump, etc. In fact, you will find the Waterman catalog a mine of interesting and valuable information about outboard motor construction. It gives in detail the essentials that you should demand in order to get full value for your money.

THE WATERMAN MOTOR CO.
201 Mt. Elliott Ave. Detroit, Mich.



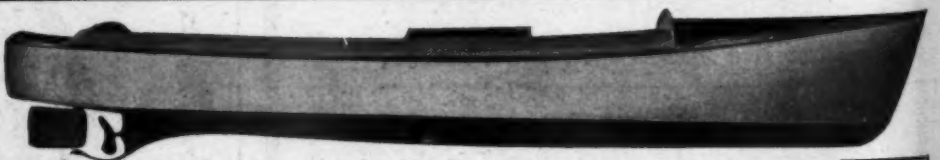
Get Your Boat At Factory Price



Shallow water FISH BOAT \$22.00

Rowboats \$18 and up—FISH BOATS \$22 and up.

Rowboats built and designed for Detachable Motors \$35.



We ship to you direct, eliminating agents' and dealers' profits. Our 16, 18 and 20-foot launches are guaranteed to stand the test of comparison in grace and symmetry of design, in substantial construction, in reliability of material and in perfect finish with boats that are selling at prices 25 to 50 per cent higher.

Thompson's Boats

All kinds of boats, all guaranteed and all at a big saving in price. Our rowboats for detachable motors are extra well built to stand the vibration—they ride swiftly and with ease and grace.

For small additional charge we supply Runabout Launches with or without engines, built semi-tunnel. Write for free catalog showing full line—motor boats, canoes, rowboats, launches. Address.

THOMPSON BROS. BOAT MFG. CO., 35 Ellis Avenue, Peshtigo, Wis.



A Mile from Shore—Back Fire from the Carburetor

The dripping gasoline ignites—then the oil-soaked floor. The red tide of fire sweeps under the pilot-house to the open bilge full of oil and water.

No help for you. Only sand and water in your boat. You must jump or burn.

It's different with Pyrene in the boat. One lurid flash of flame—a swift shot or two with Pyrene—that's all. Save your boat and every life aboard.

The law requires a Fire Extinguisher. Safety demands Pyrene.

\$7.50 each, complete with bracket.

Approved by the U. S. Steamboat Inspection Service. Sold by marine, auto supply and hardware dealers.

Write for Motor Boat Booklet.

PYRENE MANUFACTURING COMPANY

Vanderbilt Avenue, New York City

There's Safety Afloat with Pyrene in the Boat.

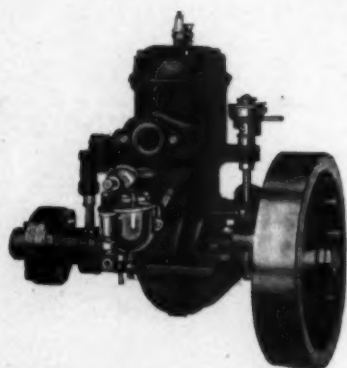


EAGLE MARINE ENGINES

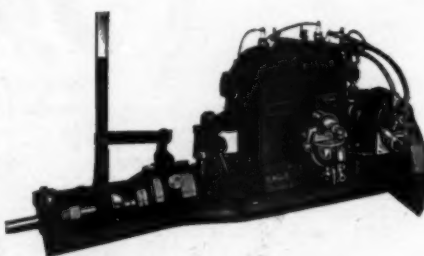
The popular priced line with excess power and excess value. You never had, and never will, purchase better value for your money than that offered you in every "EAGLE" Engine.

DO NOT PROCRASTINATE

1916 promises to demand more engines than there are facilities to produce. Manufacturers cannot purchase raw materials and deliver goods as promptly as in the past. There has been an evolution in business, resulting from enormous demands for all kinds of products, with the result that to go in the market today and attempt to secure supplies is almost impossible. Therefore, arrange for your engine requirements *early*, and be sure to arrange with a manufacturer who is likely to render you satisfactory service. You will find it more important than ever this year to use discrimination as to your source of supply.



It appears almost useless for us after 17 years of continuous national advertising and with a business record unsurpassed, to place our merits before you for consideration at this time, nevertheless there are a few of the better class dealers that we feel should be associated with us and selling the most complete and up-to-date line of 2-cycle engines on the market.



We have a large and varied line to choose from. Our popular-priced high-speed Models have no competition. They are in a class by themselves. They hold all records for speed and horsepower development and their construction is of surpassing quality.

Our Medium-Speed line of Engines is too well known to require any special mention. They have been a standard for 8 years, and the durability of this line is known all over the world, having shipped them to practically all foreign countries.

The Heavy Duty "EAGLE" Engine, for work boats and auxiliary purposes, cannot be improved upon. There are engines of this type in service that have been used continuously for 16 years, which is sufficient evidence of their value.

Therefore, we address ourselves to the live dealer, to the dealer who has an established business, who is sufficiently alert to grasp the importance of representing an established popular line and who realizes the importance and value of an association with an established house.

THE STANDARD CO., TORRINGTON, CONNECTICUT

PARAGON REVERSE GEARS

of this new yoke-operating mechanism are being rapidly adopted by marine boat builders who have extended their engine beds

THIS new model of the well-known Paragon has made an immediate appeal to engine builders who want to secure a compact installation. It is shorter than other models, and considerable room below the gear is saved by the elimination of any lower link. The operating mechanism rests upon and is attached directly to the engine bed. This results in an especially clean and compact installation and its stability greatly reduces any possible vibration.

Note especially the ingenious stop links, which securely lock the gear in position.

When you place your order for your new motor, you will probably wisely buy a unit power plant. A motor with this yoke-operating Paragon will give you a power plant in which you may always have implicit confidence.

PARAGONS OFFER A WIDE CHOICE

There is a Paragon Gear for every size and type of motor. Nearly all the high-grade motor builders in the country are furnishing Paragons as a part of their regular equipment. The experience of these men who have studied marine transmission should be your guide on the gear question.

The Paragon enclosed type has been especially popular during the past year, and has marked another step in advance in reverse gear construction. Information regarding the Paragon Enclosed and other popular Paragon models will be gladly sent upon request.

PARAGON GEAR WORKS

Evans Stamping & Plating Co.

Cushman St., Taunton, Mass.

Manufacturers Using PARAGON Reverse Gears

Anderson Engine Co.
Bridgeport Motor Co.
Buffalo Gasoline Motor Co.
Clay Engine Co.
H. C. Doman Co.
Fairbanks-Morse & Co.
Frisbie Motor Co.
Fulton Manufacturing Co.
Gray Motor Co.
Hall Gas Engine Co.
Hettinger Engine Co.
Holmes Motor Co.
Kermath Manufacturing Co.
Lamb Engine Co.
J. W. Lathrop Co.
Geo. Lawley & Son Corp.
Loane-Trask Engine Co.
Mason Machine Works
Mercury Motor Co.
Mianus Motor Works
Missouri Engine Co.
Red Wing Motor Co.
Regal Gasoline Engine Co.
Scripps Motor Co.
Sloane-Daniel Motor Co.
The Standard Co.
The Stanley Co.
Teel Motor Co.
Van Blerck Motor Co.
Vim Motor Co.
Wisconsin Motor Mfg. Co.
And Numerous Others



"SANDS" MARINE SANITARY FIXTURES

The World's Best

Highest quality—Superior appointments—
expense of installation and maintenance—
without reserve.

Value in

Longest efficient
—First cost
Prompt shipment.

Marine Plumbing Equipment

Service — Minimum
reasonable—Guaranteed

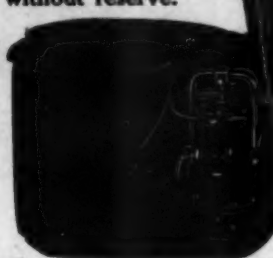


The "Frisco"—Plate S-2046
(Design Patented—Copyrighted)

The "FRISCO" PUMP WATER CLOSET, extra heavy Vitro-Adamant Oval Hopper Bowl. THREE (3) INCH supply and waste pump. All metal parts smoothed.

Plate S-2045 Polished oak seat, no cover \$59.00

Plate S-2046 Polished oak seat with cover \$60.00
Dimensions: Width, 24"; front to back, 21"; height, 17 1/4". Weight: Net, 80 lbs.; shipping, 150 lbs.



"Florida"—Plate S-2015
(Patented—Copyrighted)

The "FLORIDA" Pump Water Closet with extra heavy oval Pedestal Vitro-Adamant Bowl. 4" combined supply and waste pump with check valve in waste arm.

Complete with oak seat and cover pump rough with finished trimmings \$100.00

Dimensions: 21" front to back; 27" wide, 21" high. Weight: 80 lbs. net; 135 lbs. Shipping.



"Iowa"—Plate S-2040
(Patented—Copyrighted)

The "IOWA" Pump Water Closet. Vitro-Adamant extra heavy oval hopper bowl, 4" supply and waste pump. Price with oak seat and cover, pump rough with polished trimmings \$85.00

Dimensions: 21" front to back; 23" wide; 19" high. Weight: Net, 80 pounds; shipping, 155 pounds.



"Mohawk Improved"—Plate S-2030
(Patented—Copyrighted)

The "MOHAWK IMPROVED" Pump Water Closet, extra heavy Vitro-Adamant oval flushing rim hopper bowl. Composition supply and waste pump, 3" cylinder. Pump rough with polished trimmings, oak seat and cover \$70.00

Dimensions: 23" front to back; 21" wide; 17" high. Weight: Net, 72 lbs.; shipping, 120 lbs.



"Commercial"—Plate S-2070
(Patented—Copyrighted)

The "COMMERCIAL" Closet for heavy duty, above water line only. Vitro-Adamant bowl. Composition flush valve. As shown with metal parts white with N. P. trimmings. \$49.00

Shipping weight, 160 lbs. Space occupied, 21" x 17".



Plate S-126

The "GLENORA" Composition flat way sea cock.

	Price
1/4 inch	\$2.25
1/2 inch	3.50
3/4 inch	5.25
1 inch	8.00
1 1/2 inch	12.00
2 inch	18.00

Size 2 1/2 inch and 3 inch also made.



"Bow" Closet—Plate S-2050
(Design Patent Applied For)

The "BOW" Closet, Vitro-Adamant bowl, 2 1/2" pump, located at rear, fitted with swing handle. Quick opening supply valve. Space occupied, 15" x 24" trimmings, oak seat \$30.00

Dimensions: Front to back, 25"; width, 14"; height, 15". Net weight, 35 lbs.; shipping, 70 lbs.



"Knockabout"—Plate S-34
(Patented—Copyrighted)

The "KNOCKABOUT" Improved Pump Water Closet, Vitro-Adamant bowl, 2 1/2" supply and waste pump. Pump rough, finished trimmings \$49.00

Weight: Net, 45 lbs.; gross, 75 lbs. Dimensions: Front to back, 19"; width, 17 1/4"; height, 14".



"Winner"—Plate S-2061
(Patented—Copyrighted)

The "WINNER" Pump Water Closet, Vitro-Adamant Round Hopper Bowl, 2 1/2" supply and waste pump. Plate S-2060 Fixture as described with oak seat \$19.00

Plate S-2061 Fixture as shown with oak seat and cover \$20.00

Dimensions: 20" front to back; 25" wide; 18" high. Weight: 56 lbs. net; 65 lbs., shipping.



Plate S-2062

The "ANGLO" Composition sea valve, for use on supply and discharge of small pump closets. Price per pair, with strainer, \$6.00



Plate S-186

The "ARCO" Folding Lavatory, N. P. cop per basin and slab, N. P. composition single-acting pump, N. P. Copper Lin- ing, oak woodwork \$25.00

Height over all, 19 1/2 inches; width, 15 inches; depth closed, 6 1/2 inches; depth, open, 18 1/2 inches; basin, 10 inches.

Plate S-187

"Arco" Folding Lavatory, same as Plate S-186, except with faucet \$22.50

Oak Woodwork \$25.00

Mahogany Finish \$25.00



Plate S-3190

The "MONA 12" Vitro-Adamant Corner Lavatory with N. P. Brass Pump and waste fittings and N. P. Copper Lin- ing. Full "g" Trap \$24.50

Plate S-3196

The "MACON" Lavatory, same as Plate S-3190, except with faucet, instead of pump and with-out trap \$9.25



Plate S-4280

New Pattern Improved All Brass Galley Pump, 2" cylinder with shut off cock. Pol. Brass \$12.50

N. P. all over \$14.00



Plate S-709

All Brass Galley Pump, 1 1/2 in. Cylinder, reversible handle with shut-off cock. Polished \$8.50

N. P. all over \$10.50

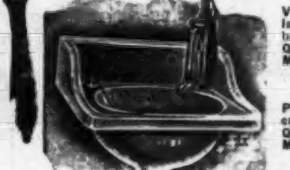


Plate S-3183

The "MANATEE 14" Vitro-Adamant Flat Back Lavatory, with N. P. Basin Pump and waste fittings; no trap \$22.75

Plate S-3180

The "MENARD" Lavatory, same as Plate S-3183, except with faucet, instead of pump and with N. P. Full "g" Trap \$13.25



Plate S-150

The "GLENWOOD" Folding Lavatory, with Vitro-Adamant oval basin, N. P. copper lining, N. P. brass double-acting pump, N. P. brass trimmings \$42.50

Quarterm oak, polished finish \$44.00

Plate S-152

"CROTON" Folding Lavatory, same as Plate S-150, except with faucet for pressure or gravity supply. \$37.50

Quarterm oak, polished finish \$39.00



Plate S-750

Double Acting Brass Auto Bilge Pump, 15 inches long under pump and fitted with 5 feet of rubber hose. Capacity 1 gallon every 4 strokes. No. 1—1 1/2" diam. \$3.00

No. 2—1 1/2" diam. 4.50

No. 3—1 1/2" diam. 24" long, with foot rest, \$5.50



Plate S-4300

Round Composition Air Ports, with heavy frame and hinge. Price of Plain Opening Plain \$17.00

8" \$13.00 12" 20.00

18" 14.50 14" 25.00



Plate S-5200

Neptune Motor Boat Bow Laniere Bracket; hinges permit bracket to lie on deck when not in use. Polished Brass \$9.75

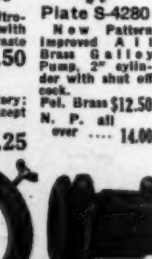


Plate S-128

The "HELENA" Composition Outdoor Connection with flap valve and coupling used on discharge of closets, lavatories, sinks.

	1/4"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"
L. P.	\$2.50	\$2.75	\$3.75	\$5.00	\$7.00		
I. P.	1.75	2.50	3.50	4.50	6.50		



Plate S-132 1/2

Cast Bronze Combination Inlet Connection with Strainer and Scoop.

	I. P.	L. P.
1/4"	\$2.25	\$2.65
1/2"	2.50	2.90
3/4"	3.00	3.40
1"	3.75	4.25
1 1/4"	4.50	5.00



Plate S-130 1/2-B

Cast Bronze Round Raised Strainer.

	2 1/2"	3"	4"	5"	6"	7"	8"
	\$6.35	.50	.50	.50	1.00	1.50	2.25
					1.50	2.25	3.00

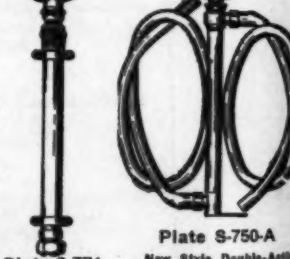


Plate S-771-A

New Style Double-Acting Brass Bilge Pump, with foot attachment and 5-ft. discharge and suction hose with brass strainer. No. 1—1 1/2" diam., 15" long \$5.00

No. 2—1 1/2" diam., 18" long \$6.00

No. 3—2" diam., 24" long \$10.00

2 24 13.00

Plate S-130

The "ALTON" Brass Inlet connection, Iron Pipe: 1 1/2" \$1.75

1 1/2" 2.25

1 1/2" 3.75

Plate S-131

The "CARLTON" Brass Out-let Connection, Iron Pipe: 1 1/2" \$1.75

1 1/2" 2.25

1 1/2" 3.75

Complete line of closets, lavatories, pumps, sinks, bath tubs, showers and marine specialties shown in NEW Catalogue "R" ready in near future, free upon request.

A. B. SANDS & SON COMPANY

Largest Manufacturers in the World

MARINE PLUMBING SPECIALISTS

22-24 Vesey St., New York, U. S. A.

1849—"SIXTY-SEVEN YEARS OF QUALITY"—1916

When writing to advertisers please mention MOTOR BOATING, the National Magazine of Motor Boating.
Advertising Index will be found on page 39.

KEROSENE

THE GASOLENE QUESTION SOLVED

Fuel Cost Reduced from 60% to 80%

Power

Reduced only 8%

Fuel Consumption

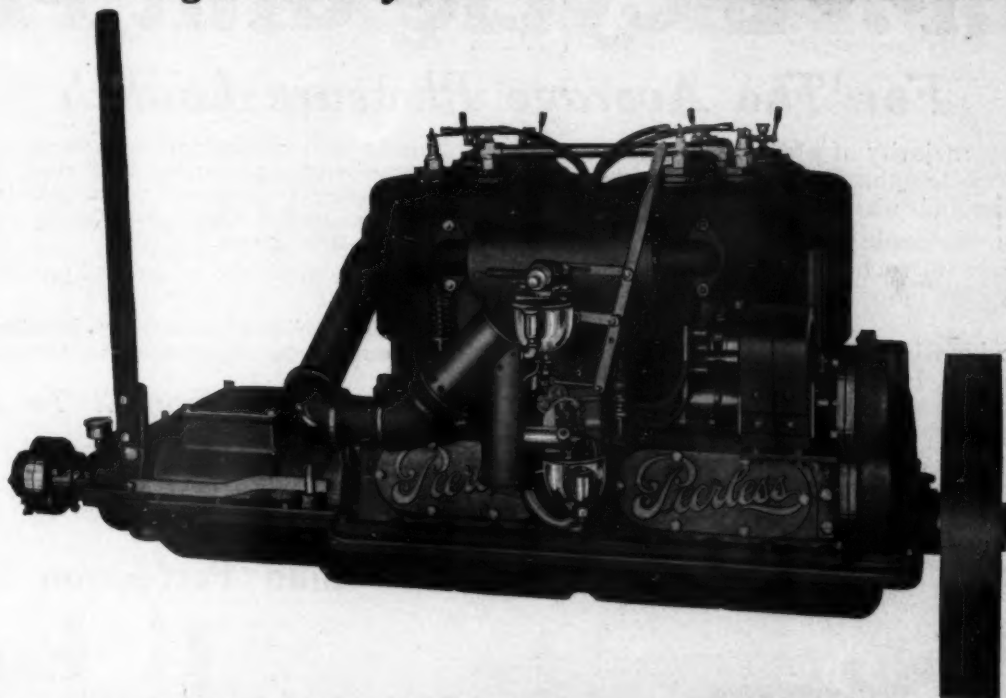
Less Than One Pint Per H. P. Hour

Reliability and Control

Equal In Every Respect To Gasolene

Sizes from Eight to Fifty H. P.

Gasolene or Kerosene



NO SMOKE

PERFECT LUBRICATION

NO EXCESSIVE CARBON DEPOSITS

THE "Peerless" Kerosene Device is the result of the very extensive experiments which have been carried on during the past few years. It has reached a state of perfection heretofore thought impossible. In this device we employ the use of two Schebler carburetors. The model "L" is used for kerosene and the model "D" is used for gasolene. By an ingenious and simple arrangement it is possible to change fuel while the engine is under full load. This arrangement is *fool proof*. The change of fuels can be made with absolute reliability. The control is operated by a single lever. There is absolutely no change in adjustment necessary. The lever may be thrown from gasolene to kerosene very suddenly without any noticeable change in the operation of the engine. It will also run without choking at any position of the lever while the change is in progress. The engine will operate at any point from all gasolene to all kerosene. This makes it possible to connect the single lever controlling the throttle for both fuels to a control which is located away from the engine.

The combustion on kerosene fuel is perfect. There is absolutely no smoke or excessive carbon deposits. A careful examination of the engine after long, continuous runs under full load has proven that there are no injurious results to the lubrication from the kerosene fuel.

The "Peerless" kerosene device can also be applied to the "Peerless" engines now in use. Full information, prices, etc., will be furnished upon request.

The "Peerless" line of engines have proven their true value by long, continuous and reliable service under all conditions. All prospective purchasers may rest assured that the kerosene device offered is in every way in-keeping with the good features of the "Peerless" engine. In the past we have developed a number of kerosene outfits. We are candid to say, however, that they did not prove successful from a practical standpoint, consequently we did not offer a kerosene device before this time.

We were not satisfied with a kerosene device that would simply run the engine. We have always taken the stand that we would not offer a kerosene device unless it was absolutely satisfactory from every standpoint. We now feel that in offering the "Peerless" Kerosene Device, that we have solved the question of the excessive gasolene cost.

Peerless Marine Motor Co., No. 10 LOCK STREET, BUFFALO, N. Y., U. S. A.

When writing to advertisers please mention MOTOR BOATING, the National Magazine of Motor Boating.
Advertising Index will be found on page 39.

CAI

8 H.P.- 2 Cycle Unit Plant

For The Average Pleasure Launch

By far the largest majority of pleasure launches range from 18 to 30 feet in length. Within this range of sizes, the average owner finds his ideal.

Some years ago, we made a special study of power plant requirements for such boats. Our investigations and experiments were thorough and exhaustive in every particular.

Based upon the knowledge thus gained, we designed and perfected our 8 H.P. Unit Plant shown below. It is a motor built for a definite service at the hands of inexperienced users.

It develops full eight horsepower, which is ample power for any family launch, up to 30 feet in length. The speed secured depends upon the type of hull used.

Next to absolute reliability, simplicity is our watchword in the design of this motor. It is so simple that women and children can operate it with perfect ease and safety.

Practically every moving part is enclosed, protecting the operator from injury and damage to clothing from splashing oil. The reversing gear is mounted on the same bed with the engine. This insures perfect alignment of shaft, reduces friction and makes gear shifting easy.

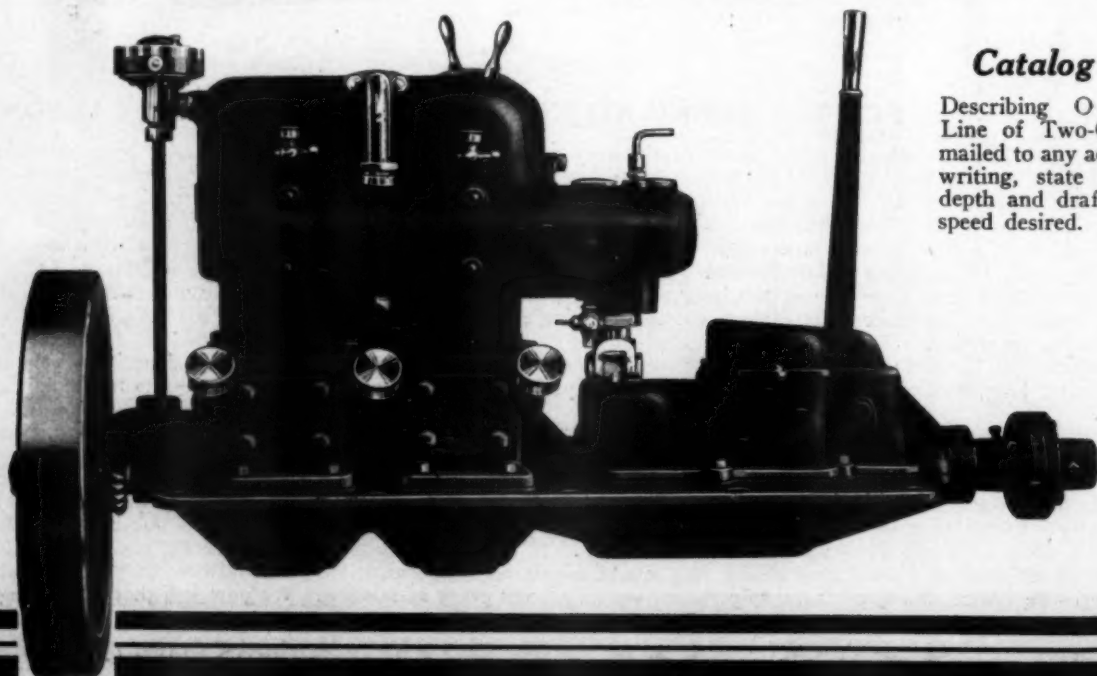
This plant is beautifully finished and provides a real ornament to any boat.

Given fuel and oil and ordinary care, it will render perfect service for years to come without tinkering, cussing or disappointment.

Other Sizes From 2 To 30 H. P.

are designed for well-defined purposes and requirements. This includes heavy duty, normal and speed service. Our engineering staff stands ever ready to advise and assist you in the proper selection of your motor.

The Caille Perfection Motor Co.



Catalog No. 24

Describing Our Complete Line of Two-Cycle Engines mailed to any address. When writing, state length, beam, depth and draft of boat and speed desired.

LLE

14 H.P. - 4 Cycle Aristocrat

Electric Starter and Lights

This marine motor has no superior. It is perfect. It is positively dependable and reliable always.

Embodies every convenience and refinement. Runs quietly, smoothly and develops a safe margin over its rated fourteen horsepower.

The Caille Aristocrat is a four-cycle motor. It has four cylinders cast en bloc, like an automobile motor.

It is electrically started and controlled. Simply pressing a button starts it. Pressing another button stops it. The motor also provides electric current for lighting the boat, from Storage Battery.

It has bulkhead control. The switches and controlling instruments are mounted on a mahogany finished dashboard. This can be located at any desired point in the boat.

The steering and complete control of the boat is centered at one place. The operator does not have to leave his seat to start, stop, reverse, or secure any of the functions of the motor.

The reversing gear is built into the motor. This insures perfect alignment of shaft and ease in gear shifting.

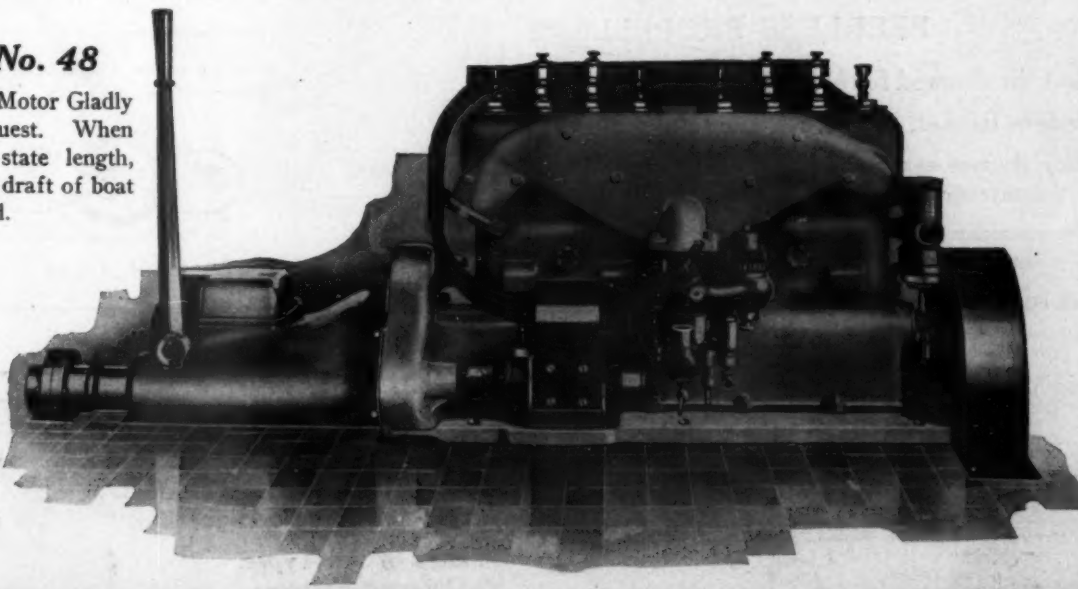
The Caille Aristocrat embodies nothing but the best in materials and equipment. Has Bosch high-tension magneto and Schebler model "R" carburetor.

It is finished in a French gray enamel with nickel trimmings and forms a real ornament for any boat.

1540 Caille Street, Detroit, Mich.

Catalog No. 48

Describing This Motor Gladly Mailed on Request. When writing, please state length, beam, depth and draft of boat and speed desired.



COLUMBIAN



THE RIGHT WHEEL FOR ANY TYPE OF BOAT

The right wheel must have the right **BLADE SURFACE**. The Columbian is the only complete line with **EVERY REQUIRED BLADE SURFACE**

THE UNITED STATES GOVERNMENT OFFICIALS KNOW THIS
THE LARGEST MANUFACTURERS OF ENGINES KNOW THIS
THE MOST PROMINENT NAVAL ARCHITECTS KNOW THIS
THE WELL INFORMED BOAT OWNERS KNOW THIS

That is one reason why they

INSIST UPON A COLUMBIAN

Many other reasons are described in our interesting propeller treatise,
PROPELLERS IN A NUT-SHELL, sent free upon request.

**COLUMBIAN BRASS FOUNDRY, 218 North Main Street
FREEPORT, NEW YORK**

New York Branch for Local City Sales Only: Concourse, 50 Church St., New York City

PEERLESS PROPELLERS

Meet the demand for lower prices.

Made in Rocket, Arrow, Reliance and Ailsa-Craig Types.

They do not carry the Columbian Trade Mark, but they are guaranteed sound, and are accurate as to pitch.

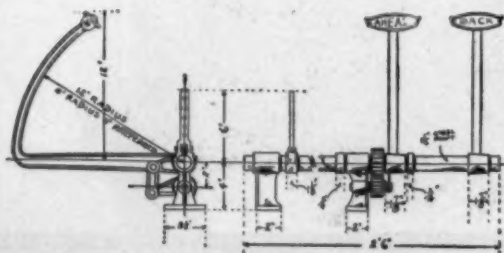
We consider them better in design, material and workmanship than most advertised **HIGH GRADE** propellers.

Ask for Peerless Price List.

Every genuine Columbian Propeller carries this Trade Mark



LOOK FOR IT



**COLUMBIAN
FOOT REVERSE CONTROL**
Operate your reverse gear with your foot.
COLUMBIAN UNIVERSAL STRUTS
Are the Best at Prices No Higher

Rudders of All Types.
50 Different Patterns.

We have something special for your boat.



**UNIVERSAL
STRUTS ARE
SELF ALIGNING.**

**"TWIN SIX"**

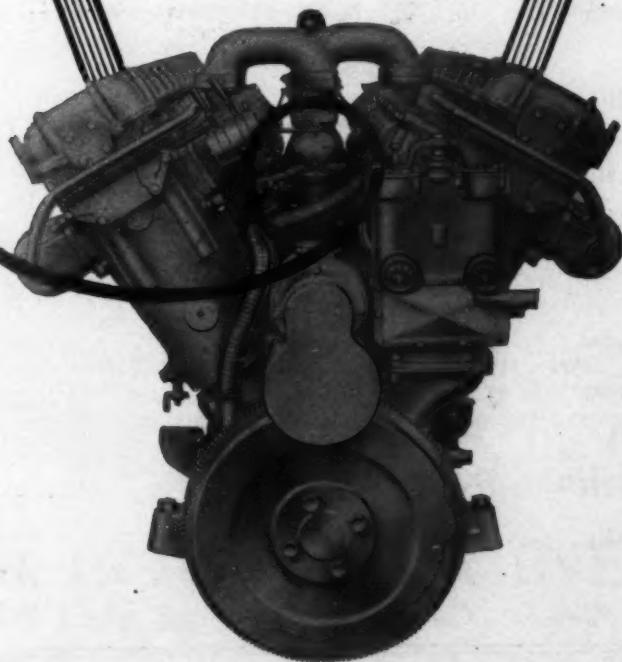
EQUIPPED WITH THE

**STEWART
DUPLIX
CARBURETOR**

Van Blerck Twin Six—the newest sensation in Marine Motors is regularly equipped with the Stewart Carburetor.

This is a wonderful tribute to the Stewart Carburetor. It is an expert acknowledgment of the correctness of the Stewart principle and workmanship. Stewart Carburetors are especially well adapted for use on Marine Motors because they give more power, make starting easy, are economical and are practically fool-proof. The Stewart is the simplest, truest and most efficient carburetor made.

DETROIT LUBRICATOR COMPANY
DETROIT, MICHIGAN



WINTON

The purchaser of an engine must of necessity take much for granted. He cannot have intimate knowledge of the degree of excellence represented in the engine he buys.

As a rule, therefore, entire dependence is placed in the engine builder to make his product measure up to the standard expected of it.

The manufacturer whose design is antiquated, whose methods are obsolete, cannot do this. However good such an engine may have been in the past, it is not to be classed with the machine of modern design and construction.

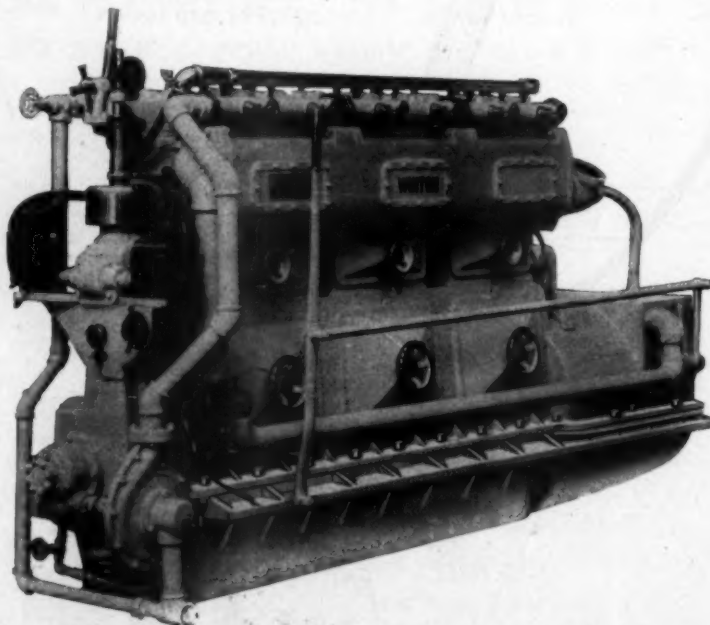
Winton engines are modern. In their design precedent was followed only so far as was compatible with progressive ideas. In construction, special tools have injected a new element of quality.

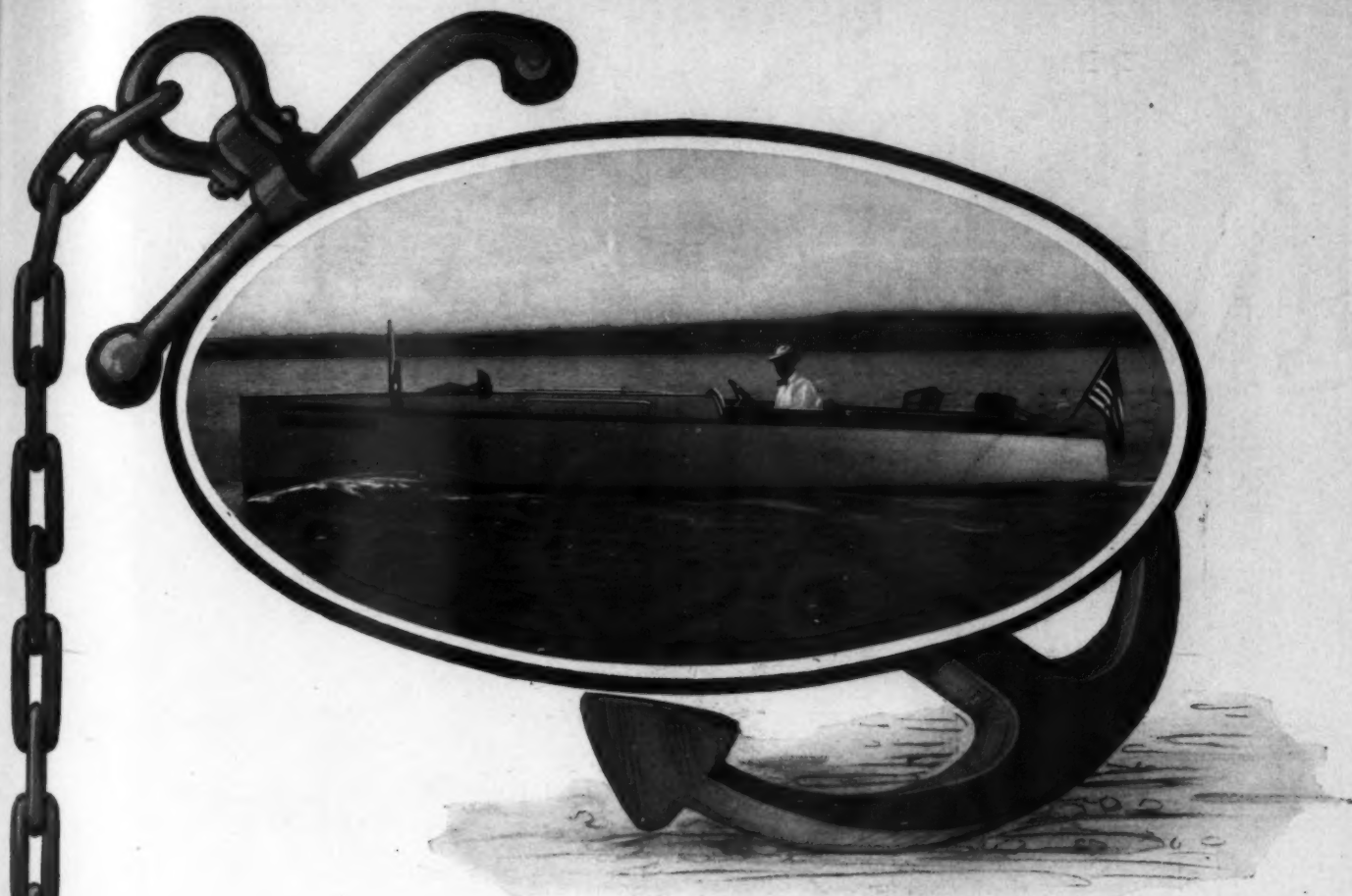
That the high quality of Winton engines will be upheld in every particular is the purchaser's protection and our guarantee.

*For complete information
address*

**Winton
Engine Works
Cleveland, Ohio**

Modernism





"TOUJOURS PRET"

(Always Ready)

Owned by Mr. Frank Rogers, of the Borden Milk Company, New York

The motor that "never missed or failed to start all summer" is a Fay & Bowen 4-cylinder, 4-cycle, $3\frac{1}{2}$ x 5 engine. Bosch magneto, of course! "Toujours Pret" is also equipped with electric starter.

September 18, 1915.
108 Hudson Street,
New York City.

My Dear Mr. Fay:

Have a look at a real boat.

This boat is well named "Toujours Pret."

The motor never missed or failed to start all summer, and was sorry to leave her at the lake.

Very truly yours,
(Signed) Frank Rogers.

Mr. Rogers himself snapped this picture of his own boat at Lake Sunapee. It's a "real boat" from stem to stern. Our Junior Runabout model, 24 ft. x 5 ft., exceptionally dry and sea-worthy; guaranteed 16 miles an hour speed.

None better built!

Mr. Rogers knows a good boat. Why not let his experience be your guide?

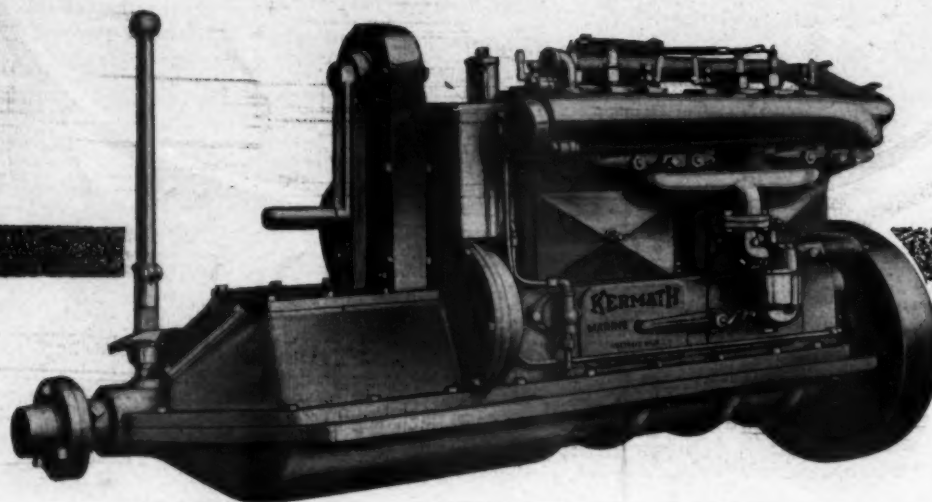
FAY & BOWEN ENGINE CO.

104 Lake Street, Geneva, N. Y., U. S. A.

Our engines are made for Canada by St. Lawrence Eng. Co., Ltd., Brockville, Ont.

KERMATH

GUARANTEED
MOTORS



The guarantee back of Kermath Motors is more than the conventional maker's promise to make good if his motor falls down. The real Kermath guarantee is the fact established by thousands of Kermath owners that the Kermath will stand up under every condition, no matter how severe.

Of course we stand back of Kermath Motors. But you don't want the kind of a motor which needs a backer. That won't help you out in emergencies.

The real Kermath guarantee gives that "Something Different" feeling that is not always secured in other motors. It is a feeling of positive security; a feeling of being safe out in rough weather; a feeling that your Kermath power plant senses and accepts its responsibilities.

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